9-2350-257-34-2-6/990

TM 9-2350-257-34-2-6

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APPENDIX B
FABRICATED TOOLS B-1

FOLDOUTS
EQUIPMENT LOCATION DIAGRAMS

This copy is a reprint which includes current pages from Change 1.

TECHNICAL MANUAL

DIRECT SUPPORT
AND GENERAL SUPPORT
MAINTENANCE MANUAL

PART 6
MAINTENANCE

TURRET
FOR TANK, COMBAT, FULL-TRACKED: 105-MM GUN, M60A1 (RISE) (2350-00-116-9765) AND M60A1 (RISE PASSIVE) (2350-01-059-1503)

HEADQUARTERS, DEPARTMENT OF THE ARMY
JULY 1980

READEX FICHE best copy available

D 101.11:

WARNING

BE CAREFUL: CARBON MONOXIDE IS A GAS THAT CAN KILL YOU

Carbon monoxide always comes when something gets hot or burns - such as heaters, engines, etc. To keep carbon monoxide from making anyone sick or drowsy, there must be plenty of fresh air in the place where the heating or burning takes place. This gas has no color and no smell, but it is deadly poisonous. It can damage your brain, or kill you, if you do not have enough fresh air coming in to push the carbon monoxide out.

Follow these rules to keep from getting poisoned:

1. Do not operate engine or heater inside a building unless there is plenty of fresh air coming in.
2. Do not idle an engine unless you are sure there is plenty of fresh air in personnel compartments.
3. Do not drive a vehicle which has inspection plates, cover plates or engine compartment doors taken off, except for very short maintenance times when necessary.
4. When operating vehicle, always be on the lookout for personnel who seem to be getting sick or drowsy. If you notice this happening, immediately get fresh air into personnel compartments. If this does not help, remove sick or drowsy personnel from vehicle and do following:
    a. Put him into fresh air.
    b. Keep him covered warm.
    c. Keep him still. Do not let him exercise. (Exercise will make him worse.)
    d. Give him artificial respiration, if necessary.
    e. Get medical help.

TM 9-2350-257-34-2-6
C1

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 18 February 1987

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

PART 6
MAINTENANCE

TURRET FOR TANK, COMBAT, FULL-TRACKED: 105-MM GUN, M60A1 (RISE) (2350-00-116-9765) AND M60A1 (RISE PASSIVE) (2350-01-059-1503)

TM 9-2350-257-34-2-6, 11 July 1980 is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.
3. New or changed illustrations are indicated by a miniature pointing hand highlighting the change.
4. The nomenclature for grenade launcher is changed to grenade discharger throughout this manual.

Remove Pages	Insert Pages	Remove Pages	Insert Pages
i and ii	i and ii	20-307 through 20-310	20-307 through 20-310
20-25 and 20-26	20-25 and 20-26	20-335 through 20-337/ (20-338 blank)	20-335 through 20-337/ (20-338 blank)
20-27 through 20-30	None	25-1 through 25-8	25-1 through 25-8
20-31 and 20-32	(20-31 blank)/20-32	25-11 through 25-20	25-11 through 25-20
20-57 and 20-58	20-57 and 20-58	A-1 and A-2	A-1 and A-2
20-237 and 20-238	20-237 and 20-238	B-1 and B-2	B-1 and B-2
20-241 and 20-242	20-241 and 20-242	B-21 through B-24	B-21 through B-24
20-245 through 20-248	20-245 through 20-248	Index 1 and Index 2	Index 1 and Index 2
20-267 through 20-282	20-267 through 20-282	FO-5	FO-5
20-283/(20-284 blank) through 20-290	20-283/(20-284 blank) through 20-290		

File this sheet in the back of the publication for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

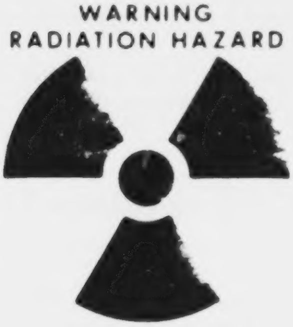
Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-37, Direct and General Support Maintenance requirements for Tank, Combat, Full Tracked, 105-MM, M60A1 RISE, and M60A1 RISE PASSIVE.

WARNING



Azimuth dial pointers in indicator are tipped with radioactive material. This becomes dangerous when dial window is broken or removed. When this happens, make repairs as soon as possible.

All maintenance must be done at depot level only, except replacement of lamps or replacement of whole indicator unit.

Protecting, handling, storing, and getting rid of radioactive material must be done in accordance with TB MED-232 and TB 750-237.

WARNING

Be careful when working around pressurized parts. Hydraulic fluid under pressure can hurt you.

WARNING

Before charging main accumulator, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before draining hydraulic system, pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before removing hydraulic tubes, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before traversing turret, make sure gun will not hit anything if turret is traversed. If necessary, move vehicle.

WARNING

Nitrogen under pressure can hurt you. Keep fingers and hands clear of valve while letting out nitrogen. Let nitrogen out slowly.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES

NOTE The portions of the text affected by the changes are indicated in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are

Original ..... 0 .....11 July 1980

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 553 **CONSISTING OF THE FOLLOWING**

Page No.	*Change No.
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A - B	0
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20-10 Blank	0
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20-302 Blank	0	22-19 - 22-21	0
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20-306 Blank	0	22-23 - 22-25	0
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20-334 Blank	0	23-1 - 23-44	0
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20-338 Blank	0	24-2 Blank	0
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21-20 Blank	0	A-1 - A-4	0
21-21 - 21-31	0	B-1 - B-26	0
21-32 Blank	0	Index 1 - Index 3	0
21-33 - 21-40	0	Index 4 Blank	0
22-1	0	FO-1 - FO-5	0
22-2 Blank	0	Metric Conversion Chart	0
22-3 - 22-13	0	Cover	0
22-14 Blank	0		

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Technical Manual
No. 9-2350-257-34-2-6

HEADQUARTERS.
DEPARTMENT OF THE ARMY
Washington, D.C. , 11 July 1980

Technical Manual Direct Support and General Support Maintenance

TURRET

FOR TANK. COMBAT.

FULL-TRACKED:

105-MM GUN,

M60A1 (RISE)
(2350-00-116-9765)
AND
M60A1 (RISE PASSIVE)
(2350-01-059-1503)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know.

Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to:

Commander
US Army Armament, Munitions and Chemical Command
ATTN: AMSMC-MAS
Rock Island, IL 61299-6000

A reply will be furnished to you.

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* This manual in conjunction with TM 9-2350-257-34-2-1, TM 9-2350-257-34-2-2, TM 9-2350-257-34-2-3, TM 9-2350-257-34-2-4, and TM 9-2350-257-34-2-5 supersedes TM 9-2350-257-34-2, December 1975, and so much of the DS/GS portion of TM 9-1000-213-35, April 1976, as pertains to the M60A1 (RISE) and M60A1 (RISE PASSIVE) Tanks, including all changes.

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CHAPTER 20

TURRET TRAVERSING MECHANISM

Section 1. SCOPE

20-1. LIST OF EQUIPMENT ITEMS CONTAINED IN THIS CHAPTER

Section	Equipment Item	Paragraph
2	Turret Traversing Mechanism	20-2
3	No-bak	20-7
4	Clutch	20-23
5	Hydraulic Motor	20-37
6	Traversing Gear Box	20-44

Section 2. TURRET TRAVERSING MECHANISM

20-2. MAINTENANCE PROCEDURES INDEX

Equipment Item	Removal	Installation	Disassembly	Assembly
1. Turret Traversing Mechanism	20-3	20-4	20-5	20-6

20-3. TURRET TRAVERSING MECHANISM REMOVAL PROCEDURE

TOOLS: 5/8" combination wrench
1-1/8" combination wrench
1" combination wrench
9/16" combination wrench
8" extension (1/2" drive)
1-1/8" socket wrench handle hinge
7/16" combination wrench (two)
11/16" combination wrench
3/4" socket (1/2" drive)
1/2" drive ratchet
Hoist
Lifting sling (NSN 4910-00-708-3778)

SUPPLIES: Oil container (2 quart minimum)
Rags (item 21, App. A)
Caps for hydraulic fittings
Plugs for hydraulic lines

PERSONNEL: Two

REFERENCES: TM 9-2350-257-10 for procedures to:
Traverse turret
Traverse cupola
TM 9-2350-257-20-2-3 for procedures to:
Remove commander's control
Remove hand traversing drive
Lower hydraulic pressure
JPG for procedure to disconnect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Turret Traversing Mechanism	FO-2	14
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6

EQUIPMENT CONDITION: Commander's control removed (TM-20-2-3)
Hand traversing drive removed (TM-20-2-3)
Driver's master control panel MASTER BATTERY switch set to OFF

GENERAL INSTRUCTIONS:

CAUTION

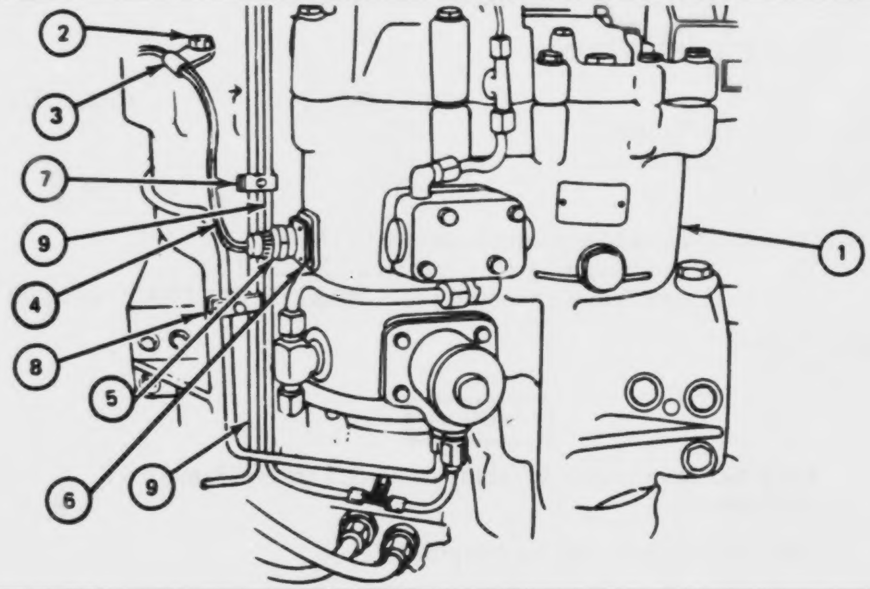
Keep dirt from getting in tubing or parts. Dirt can damage equipment.

Use container and rags for oil spillage.

20-3. TURRET TRAVERSING MECHANISM REMOVAL PROCEDURE (CONT)

FRAME 1

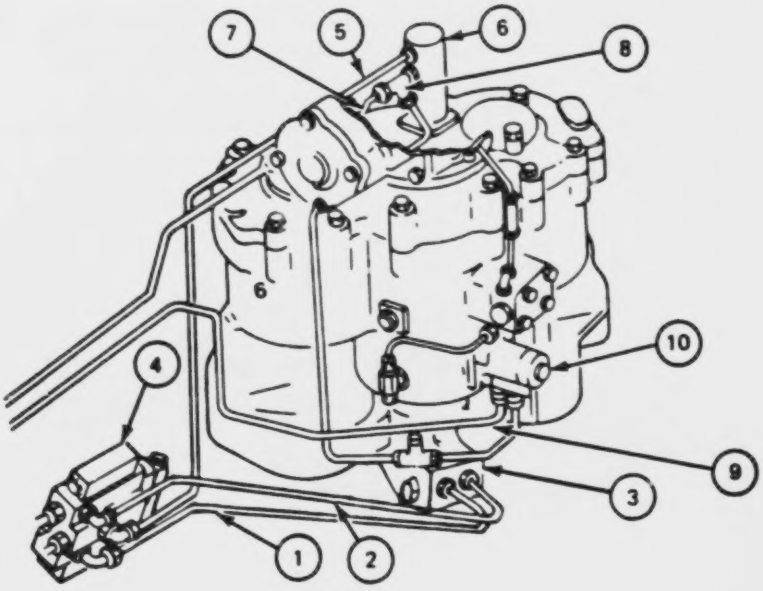
Step	Procedure
1.	Traverse turret until traverse mechanism (1) can be reached from driver's compartment (TM-10).
2.	Set turret traverse lock to LOCKED (TM-10).
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
3.	Lower hydraulic system pressure to 0 psi (TM-20-2-3).
4.	Using 5/8" wrench, remove screw (2) that attaches clamp (3) securing wiring harness (4) to traversing mechanism (1).
5.	Remove clamp (3) from screw (2). Put screw in traversing mechanism (1).
6.	Using 1" wrench, remove nut (5). Disconnect wiring harness (4) from connector (6) (JPG). Place wiring harness away from traversing mechanism (1).
7.	Using two 7/16" wrenches, remove clamps (7) and (8) from hydraulic tubing (9). GO TO FRAME 2



20-3. TURRET TRAVERSING MECHANISM REMOVAL PROCEDURE (CONT)

FRAME 2

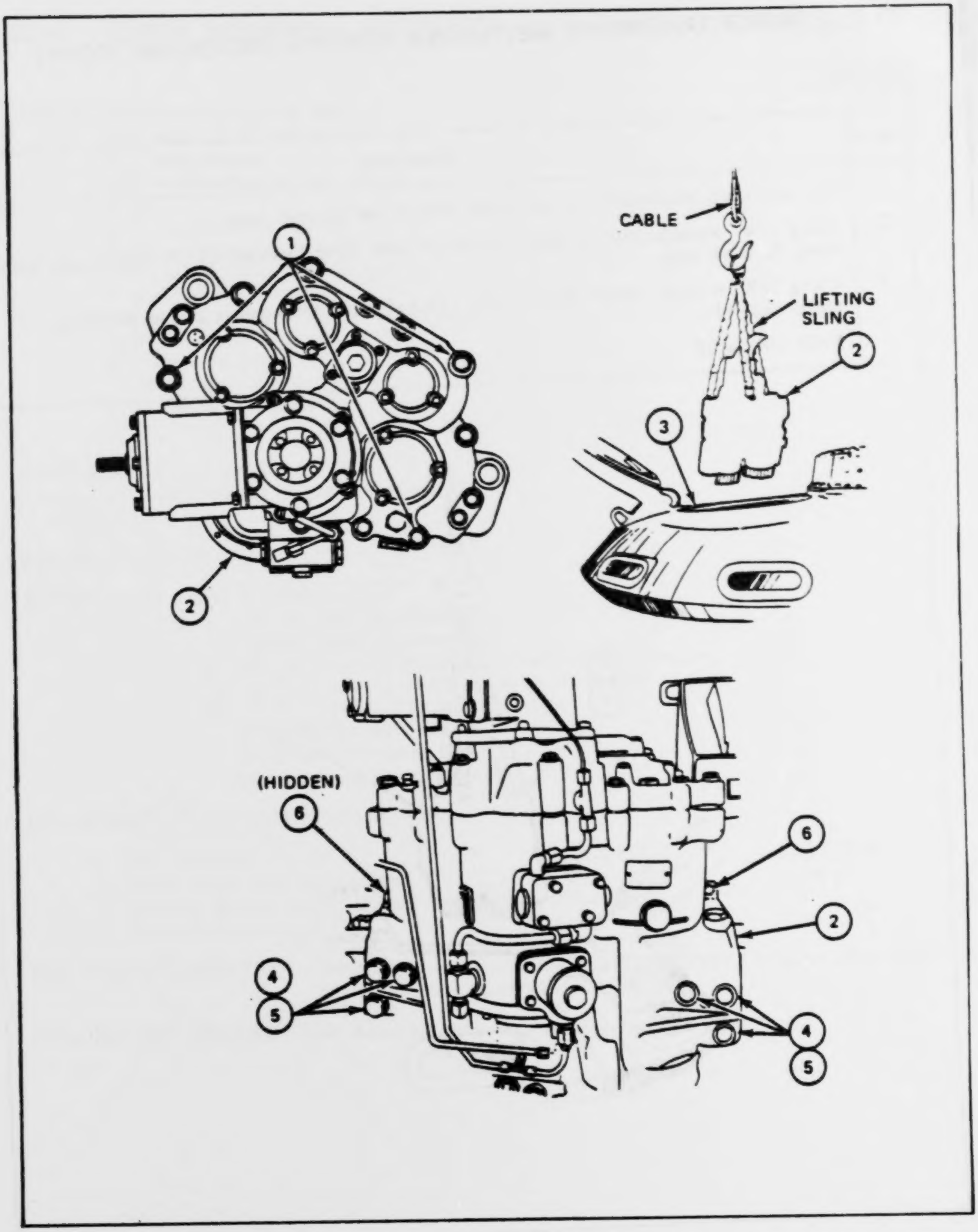
Step	Procedure
	NOTE Do not remove adapters or tees during tube removal. Plug or cap fittings and tube ends. Use container to catch fluid spills.
1.	Using 1" and 1-1/8" wrenches, remove tube (1) and tube (2) from hydraulic motor (3) and traverse stabilizer valve (4).
2.	Using 9/16" and 11/16" wrenches, remove tube (5) from antibacklash valve (6) and traverse stabilizer valve (4).
3.	Using 7/16" and 9/16" wrenches, disconnect tube (7) at tee (8).
4.	Using 9/16" and 11/16" wrenches, disconnect tube (9) at pinlock (10).
	GO TO FRAME 3



20-3. TURRET TRAVERSING MECHANISM REMOVAL PROCEDURE (CONT)

FRAME 3

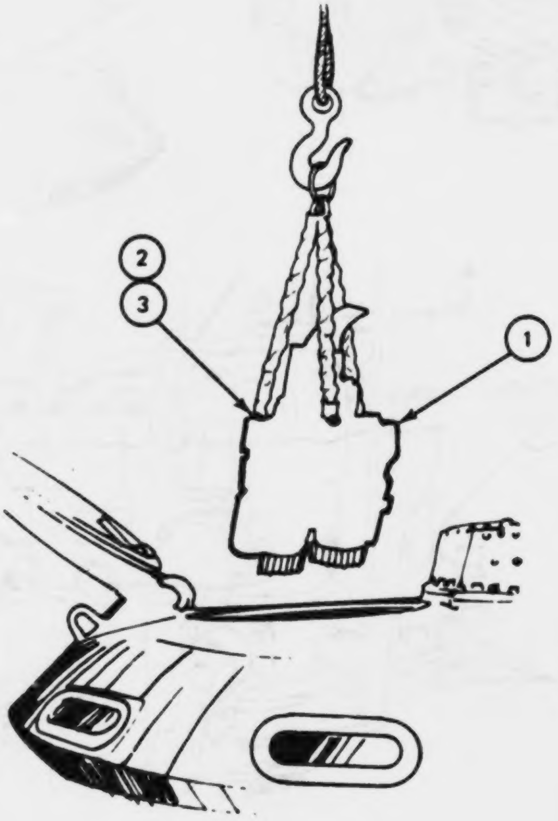
Step	Procedure
1.	Using 5/8" wrench, remove three screws (1) on traversing mechanism (2).
2.	Using 5/8" wrench, attach lifting sling to traversing mechanism (2) with three screws (1).
3.	Traverse cupola until machine gun cradle is in direction of loader's hatch (TM-10).
4.	Using hoist attached to sling through commander's hatch (3), take up slack in sling.
5.	Using 3/4" socket wrench, remove six screws (4) and six lockwashers (5) that attach traversing mechanism (2) to turret.
	WARNING Traversing mechanism is heavy enough to hurt you and damage equipment. Traversing mechanism may swing toward rear of turret. Let hoist support traversing mechanism and use hands to guide it.
6.	Using 1-1/8" socket wrench with extension and hinged handle, remove two bolts (6) that attach traversing mechanism (2) to turret.
7.	Soldier A: Operate hoist while soldier B guides traversing mechanism (2) through commander's hatch (3). Remove traversing mechanism from vehicle. GO TO FRAME 4


CABLE
LIFTING SLING
(HIDDEN)

20-3. TURRET TRAVERSING MECHANISM REMOVAL PROCEDURE (CONT)

FRAME 4

Step	Procedure
1.	Put traversing mechanism (1) on work surface and remove hoist.
2.	Using 5/8" wrench, remove three screws (2) and three lockwashers (3) that attach lifting sling. Remove sling.
3.	Using 5/8" wrench, install three screws (2) and three lockwashers (3) in traversing mechanism (1). END OF TASK



20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE

TOOLS: External retaining ring pliers
3/4'' socket (1/2'' drive)
1/2'' drive ratchet
5/8'' combination wrench
Hoist
9/16'' combination wrench
11/16'' combination wrench
7/16'' combination wrench (two)
1'' combination wrench
Lifting sling (NSN 4910-00-708-3778)
5/16'' socket (3/8'' drive)
3/8'' drive ratchet
1-1/8'' socket (1/2'' drive)
8'' extension (1/2'' drive)

SUPPLIES: Rags (item 21, App. A)
Oil container (2 quarts minimum)

PERSONNEL: Two

REFERENCES: JPG for procedures to:
Use retaining ring pliers
Connect electrical connections
LO 9-2350-257-12 for procedure to add oil to power pack
TM 9-2350-257-10 for procedure to traverse turret
TM 9-2350-257-20-2-3 for procedures to:
Install commander's control
Install hand traversing drive
Adjust anti-backlash mechanism

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Turret Traversing Mechanism	FO-2	14
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traverse lock set to LOCKED

PRELIMINARY PROCEDURES: Assemble turret traversing mechanism (para 20-6)

20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE (CONT)

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in tubing or parts. Dirt can damage equipment.

NOTE

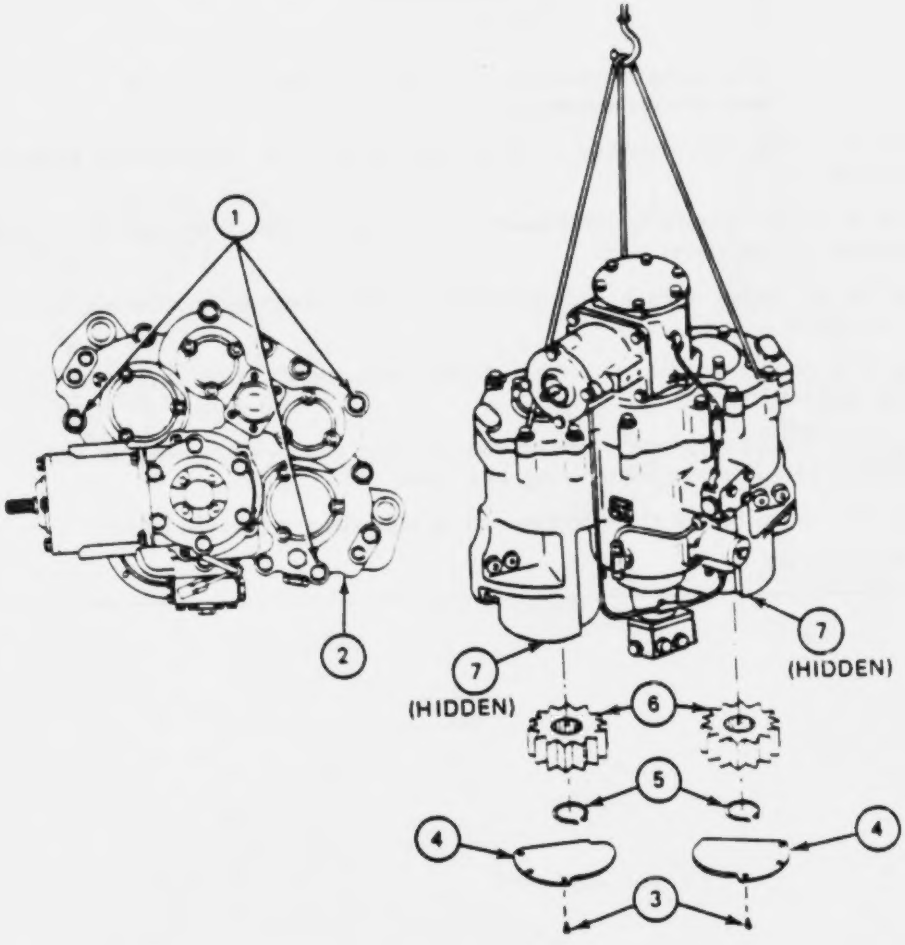
Use container and rags for oil spillage. For traversing gear box to work properly, part numbers of clutch, no-bak, traversing gear box and hand traversing drive must match part numbers as follows:

Traversing Gear Box	Clutch	No-bak	Hand Traversing Drive
11637204	7972927	10940697	11674019
11637204-1	7972947-1	10951651	10911418-4

20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE (CONT)

FRAME 1

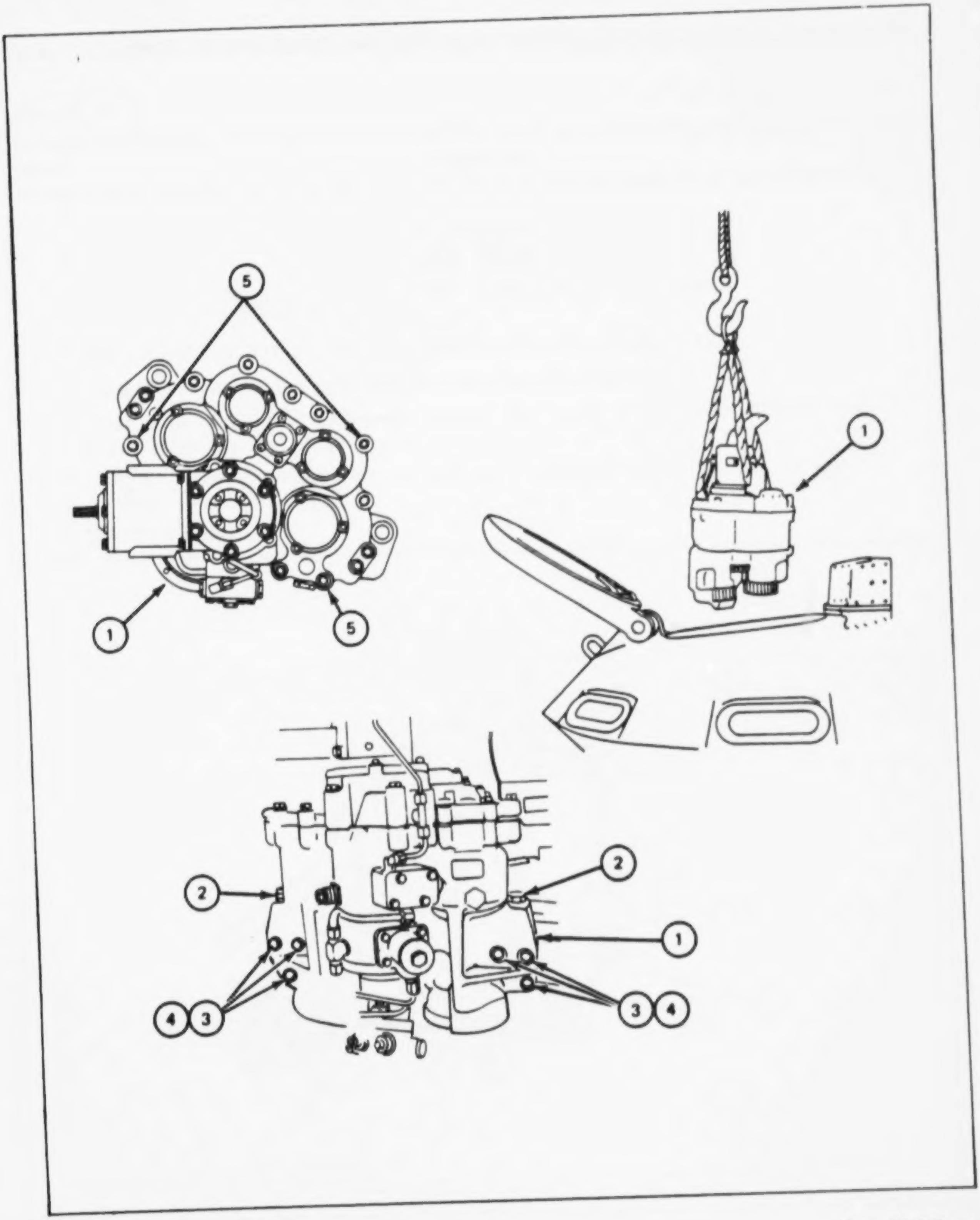
Step	Procedure
1.	Using 5/8" wrench, remove three screws (1) on traversing mechanism (2).
2.	Using 5/8" wrench, attach lifting sling to traversing mechanism (2) with three screws (1). **NOTE** Traversing mechanism (2) is outside of vehicle. Two drive pinions (6) must be removed to aid installation of traversing mechanism.
3.	Using 5/16" socket wrench, remove six screws (3) that attach two guard plates (4) to gear box (2). Remove two guard plates (4).
4.	Using pliers, remove two retaining rings (5) that attach two drive pinions (6) to two shafts (7) (JPG). Remove two drive pinions.
	GO TO FRAME 2


(HIDDEN)
(HIDDEN)

20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE (CONT)

FRAME 2

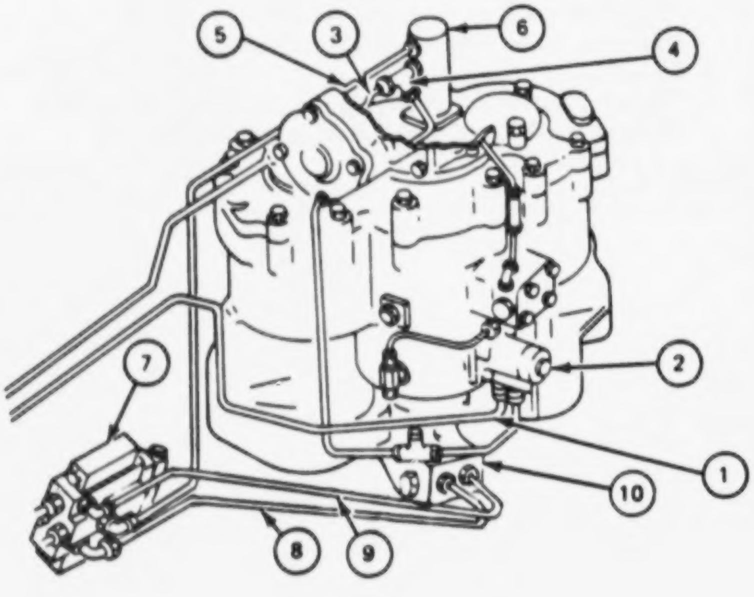
Step	Procedure
	WARNING Traversing mechanism (1) is heavy enough to hurt you and damage equipment.
1.	Soldier A: Using hoist attached to sling, take up slack in sling and lift traversing mechanism (1).
2.	Soldier B: Guide traversing mechanism (1) through commander's hatch. Put traversing mechanism (1) on turret ring.
3.	Using 1-1/8" socket wrench with extension, attach traversing mechanism (1) to turret with two bolts (2).
4.	Using 3/4" socket wrench, attach traversing mechanism (1) to turret with six screws (3) and six lockwashers (4).
5.	Using 5/8" wrench, remove three screws (5) that attach lifting sling to traversing mechanism (1). Remove lifting sling and hoist.
6.	Using 5/8" wrench, put three screws (5) in traversing mechanism (1).
	GO TO FRAME 3


4 3
3 4

20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE (CONT)

FRAME 3

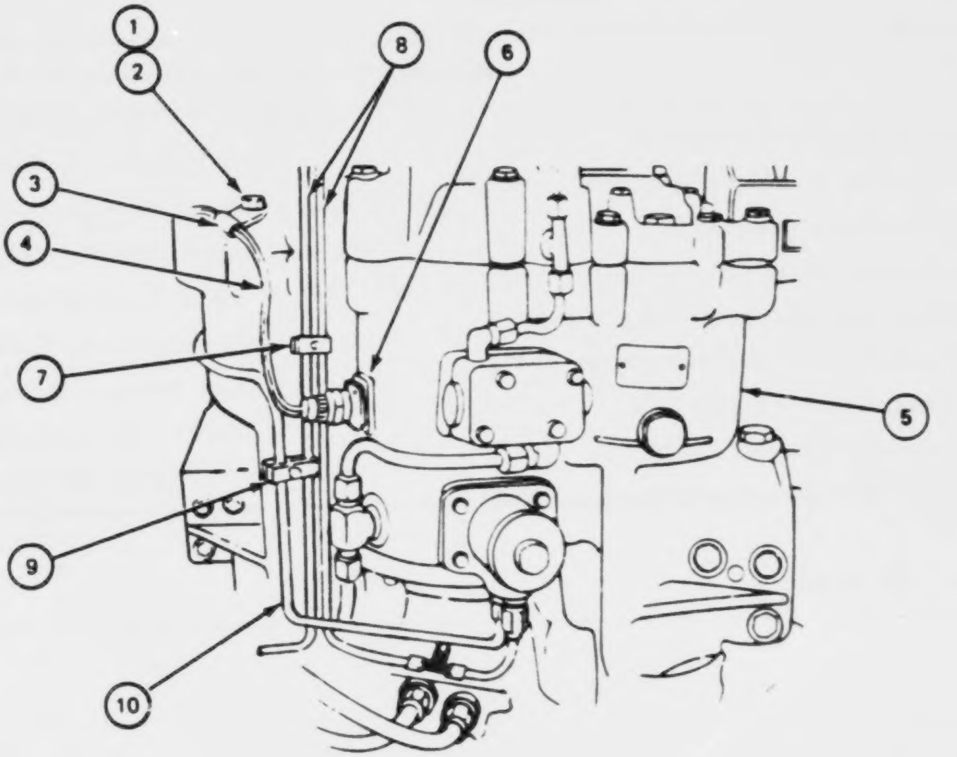
Step	Procedure
	CAUTION Align and start all hydraulic tubes using hands to avoid cross threading.
1.	Using 9/16" and 11/16" wrenches, connect tube (1) at pinlock (2).
2.	Using 7/16" and 9/16" wrenches, connect tube (3) at tee (4).
3.	Using 9/16" and 11/16" wrenches, connect tube (5) to anti-backlash valve (6) and traverse stabilizer valve (7).
4.	Using 1" wrench, connect tubes (8) and (9) to hydraulic motor (10) and traverse stabilizer valve (7). GO TO FRAME 4



20-4. TURRET TRAVERSING MECHANISM INSTALLATION PROCEDURE (CONT)

FRAME 4

Step	Procedure
1.	Using 5/8" wrench, remove screw (1) and washer (2).
2.	Using 5/8" wrench, attach clamp (3) with wiring harness (4) to traversing mechanism (5) with screw (1) and washer (2).
3.	Using 1" wrench, connect wiring harness (4) to magnetic brake connector (6).
4.	Using two 7/16" wrenches, attach two piece clamp (7) to two tubes (8).
5.	Using two 7/16" wrenches attach two piece clamp (9) to two tubes (8) and (10).
	NOTE Drive pinions removed in frame 1 will be installed during anti-backlash mechanism adjustment. Follow-on Maintenance Action Required: Install hand traversing drive (TM-20-2-3). Install commander's control (TM-20-2-3). Perform anti-backlash adjustment (TM-20-2-3). Fill power pack to proper level (LO). Traverse turret three times to bleed air from system (TM-10). Traverse turret in power mode to make sure turret traverse mechanism is operating properly (TM-10).
	END OF TASK



20-5. TURRET TRAVERSING MECHANISM DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedures to:
Remove no-bak
Remove pinlock
Disassemble pinlock

PRELIMINARY PROCEDURES: Remove turret traversing mechanism (para 20-3)

FRAME 1

Step	Procedure
1.	Remove no-bak (TM-20-2-3).
2.	Disassemble no-bak (para 20-10).
3.	Remove clutch (para 20-26).
4.	Disassemble clutch (20-28).
5.	Remove hydraulic motor (para 20-40).
6.	Disassemble hydraulic motor (para 20-42).
7.	Remove pinlock (TM-20-2-3).
8.	Disassemble pinlock (TM-20-2-3).
9.	Disassemble traversing gear box (para 20-47).
	END OF TASK

20-6. TURRET TRAVERSING MECHANISM ASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedures to:
Assemble pinlock
Install pinlock
Install no-bak

FRAME 1

Step	Procedure
1.	Assemble traversing gear box (para 20-48).
2.	Assemble pinlock (TM-20-2-3).
3.	Install pinlock (TM-20-2-3).
4.	Assemble hydraulic motor (para 20-43).
5.	Install hydraulic motor (para 20-41).
6.	Assemble clutch (para 20-29).
7.	Install clutch (para 20-27).
8.	Assemble no-bak (para 20-11).
9.	Install no-bak (TM-20-2-3).
	END OF TASK

Section 3. NO-BAK

20-7. MAINTENANCE PROCEDURES INDEX

	TASKS						
Equipment Item	**Inspection**	**Test**	**Removal**	**Installation**	**Disassembly**	**Assembly**	**Repair**
1. No-bak	20-8	20-9	. . .	. . .	20-10	20-11	. . .
2. Cover	. . .	. . .	20-12	20-13	20-14	20-15	. . .
3. Bevel Gear	. . .	. . .	20-16	20-17	. . .	. . .	20-18
4. Housing	. . .	. . .	20-16	20-17	20-19	20-20	. . .
5. Shaft Coupling	. . .	. . .	20-21	20-22	20-21	20-22	. . .

20-8. NO-BAK INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble no-bak as required (para 20-10)

GENERAL INSTRUCTIONS:

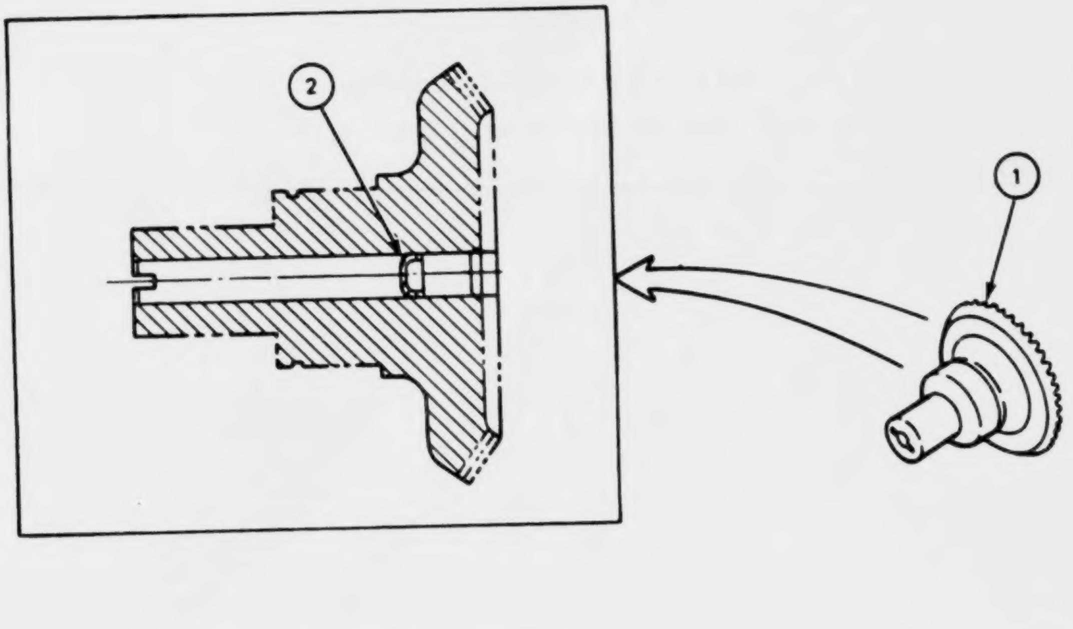
NOTE

If part is bad, order repair part or next higher assembly as required.

a. **Bevel Gear**

FRAME 1

Step	Procedure
1.	Check bevel gear (1) for presence of plug (2). If plug is missing, install plug (para 20-20). GO TO FRAME 2



20-8. NO-BAK INSPECTION PROCEDURE (CONT)

b. Cover, Housing and Bevel Gear

FRAME 2

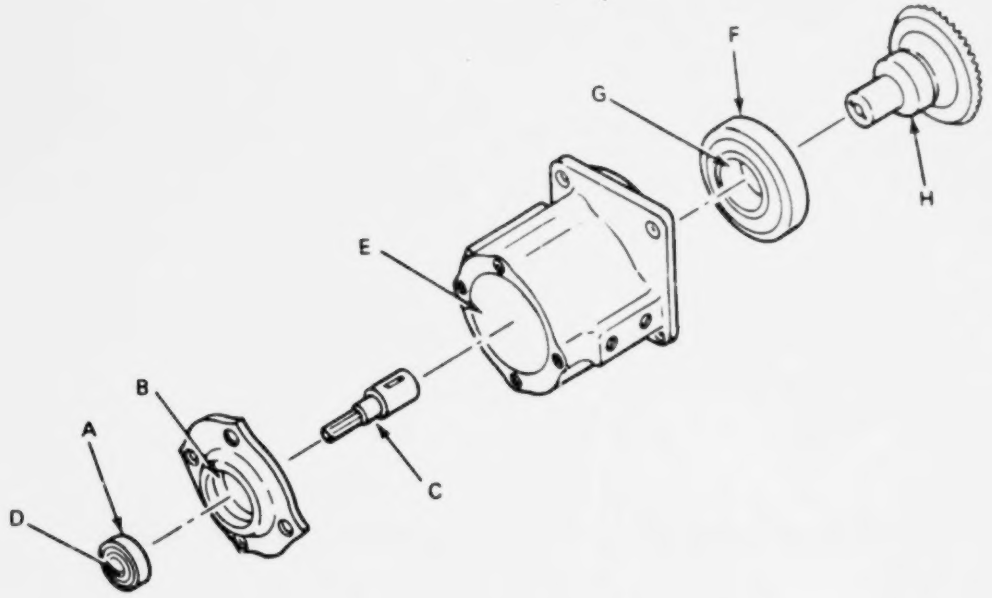
Step	Procedure
	SUPPORT SHOP WORK
1.	Take two bearings, cover, housing, shaft, and bevel gear to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	OD of bearing	1.5745 to 1.5748
B	ID of housing cover bore	1.5757 to 1.5753
C	OD of shaft shoulder	0.6692 to 0.6695
D	ID of bearing	0.6690 to 0.6693
E	ID of housing	3.1496 to 3.1503
F	OD of bearing	3.1491 to 3.1496
G	ID of bearing	1.5743 to 1.5748
H	OD of bevel gear shoulder	1.5749 to 1.5753

NOTE

Tag parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return all parts to turret shop.
	END OF TASK


F
G
H
E
B
A
C
D

20-9. NO-BAK TEST PROCEDURE

TOOLS: 1/2" drive torque wrench (0-50 inch-pounds)
Torque socket (NSN 5120-00-627-8018)
Vise with brass caps

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove no-bak

EQUIPMENT CONDITION: No-bak removed (TM-20-2-3)

PRELIMINARY PROCEDURE: No-bak assembled (para 20-11)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, no-bak is bad. Replace bad part (para 20-10).

a. Deleted

All data on pages 20-27 thru 20-31, including Frames 1 thru 3, deleted.

20-9. NO-BAK TEST PROCEDURE (CONT)

c. Torque Test

FRAME 4

Step	Procedure
1.	Using torque wrench and special socket, apply torque to splined input shaft.
2.	The torque required to maintain motion of the splined shaft shall not vary more than 5 inch-pounds (0.6 N.m) and the maximum torque shall not exceed 22 inch-pounds (2.5 N.m). If these requirements are not met replace spring in shaft coupling (para 20-21 and 20-22). **NOTE** If normal indication was obtained, no-bak is good. END OF TASK

20-10. NO-BAK DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove no-bak

EQUIPMENT CONDITION: No-bak removed (TM-20-2-3)

FRAME 1

Step	Procedure
1.	Remove cover (para 20-12).
2.	Remove shaft coupling (para 20-21).
3.	Remove bevel gear (para 20-16).
4.	Disassemble cover (para 20-14).
5.	Disassemble housing (para 20-19).
	END OF TASK

20-11. NO-BAK ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble housing (para 20-20).
2.	Assemble cover (para 20-15).
3.	Install bevel gear (para 20-17).
4.	Install shaft coupling (para 20-22).
5.	Install cover (para 20-13).
	NOTE Follow-on Maintenance Action Required: Test no-bak (para 20-9).
	END OF TASK

20-12. COVER REMOVAL PROCEDURE

TOOLS: 1/2" combination wrench
8 ounce ball peen hammer
1/2" drift pin

PERSONNEL: One

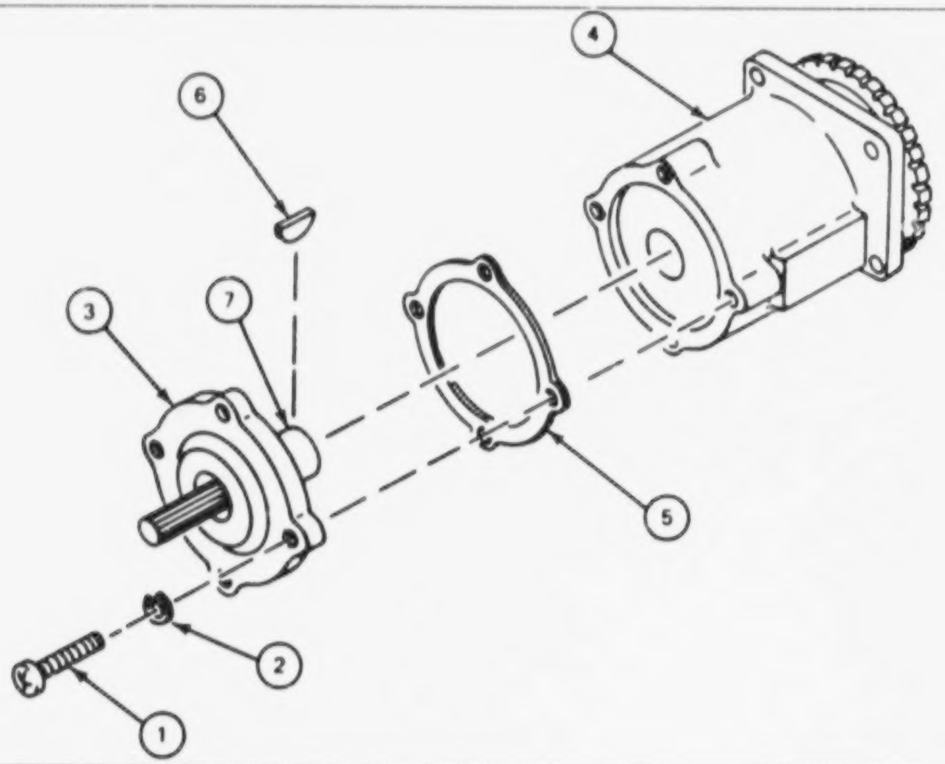
REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove no-bak

EQUIPMENT CONDITION: No-bak removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test no-bak (para 20-9)

FRAME 1

Step	Procedure
1.	Using wrench, remove four screws (1) and four lockwashers (2) that attach cover (3) to housing (4).
2.	Using hammer and drift pin, lightly tap and remove cover (3) and shims (5).
3.	Using hammer and drift pin, remove woodruff key (6) from shaft (7).
	END OF TASK



20-13. COVER INSTALLATION PROCEDURE

TOOLS: Feeler gauge
1/2" socket (3/8" drive)
3/8" drive ratchet
3/8" drive torque wrench (0-150 inch-pounds)
20 ounce ball peen hammer

SUPPLIES: Shim (8734023) as required

PERSONNEL: One

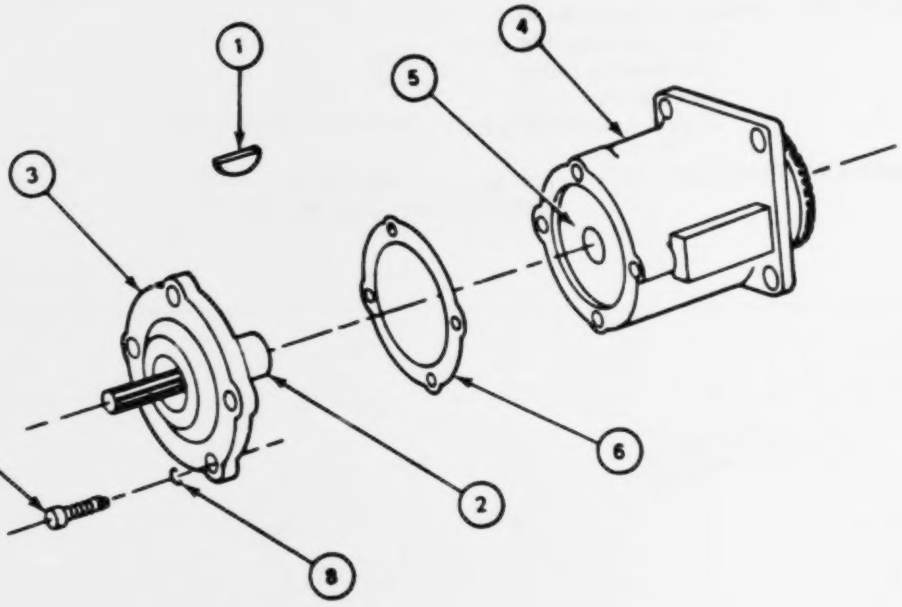
REFERENCES: JPG for procedure to use torque wrench.

PRELIMINARY PROCEDURES: Assemble cover (para 20-15)
Install shaft coupling (para 20-22)

20-13. COVER INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hammer, put woodruff key (1) in shaft (2).
	NOTE Cover (3) must be shimmed to obtain between 0.000" and 0.010" end play between shaft (2) and shaft coupling (5).
2.	Put cover (3) on housing (4) with woodruff key (1) of shaft (2) in line with keyway in shaft coupling (5).
3.	Using feeler gauge, check end play between cover (3) and housing (4).
	NOTE If measurement obtained is less than 0.010", omit steps 4 and 5.
4.	Remove cover (3).
5.	Put shim (6) on housing (4) and repeat steps 2 and 3.
6.	Using socket wrench, attach cover (3) to housing (4) with four screws (7) and four lockwashers (8).
7.	Using torque wrench, torque screws (7) to between 96 and 120 inch-pounds (JPG).
	NOTE Follow-on Maintenance Action Required: Test no-bak (para 20-9).
	END OF TASK



20-14. COVER DISASSEMBLY PROCEDURE

TOOLS: 3/8" flat tip screwdriver
External retaining ring pliers
Plastic face hammer
Bearing puller
1/8" flat tip screwdriver
Vise with brass caps
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

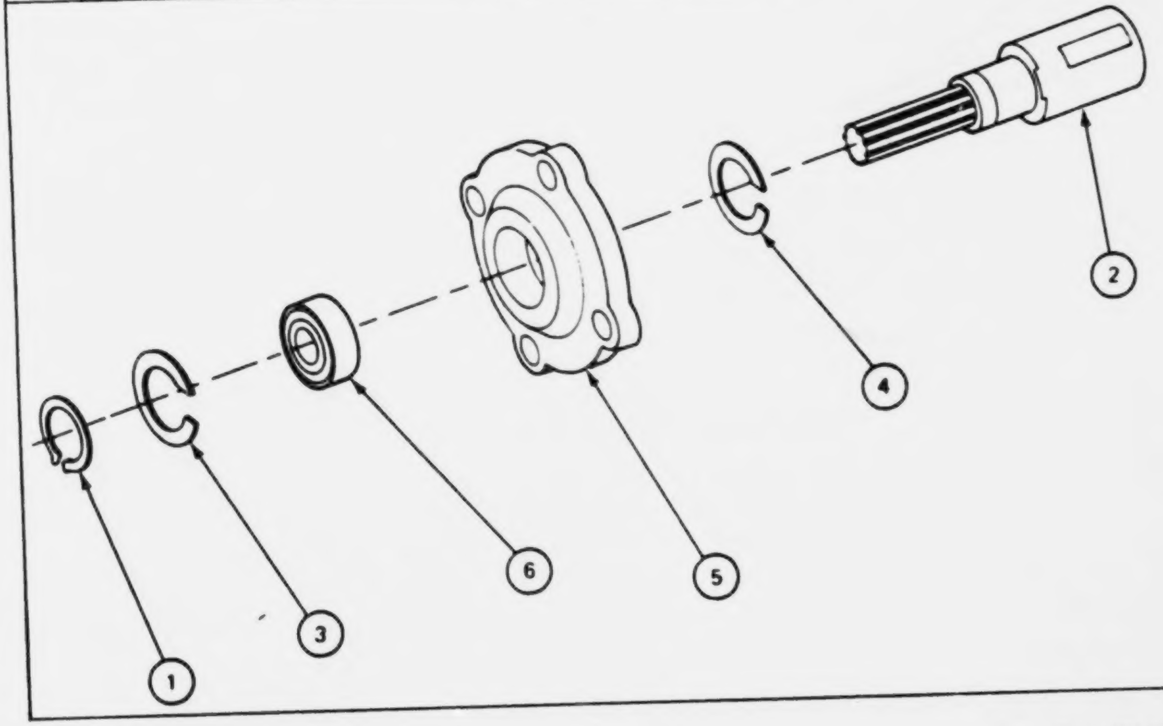
REFERENCES: JPG for procedures to:
Use retaining ring pliers
Use bearing puller
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test no-bak (para 20-9)
Remove cover (para 20-12)

20-14. COVER DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE It may be necessary to put cover (5) in vise.
1.	Using pliers, remove retaining ring (1) from shaft (2) (JPG).
2.	Using two screwdrivers, remove two retaining rings (3) and (4) from cover (5).
3.	Using hammer, lightly tap shaft (2) and bearing (6) from cover (5).
4.	Using bearing puller, remove bearing (6) from shaft (2) (JPG).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-8b).
	END OF TASK



20-15. COVER ASSEMBLY PROCEDURE

TOOLS: External retaining ring pliers
1/8" flat tip screwdriver
1/4" drift pin
8 ounce ball peen hammer

PERSONNEL: One

REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Inspect cover (para 20-8b)

20-15. COVER ASSEMBLY PROCEDURE (CONT)

FRAME 1

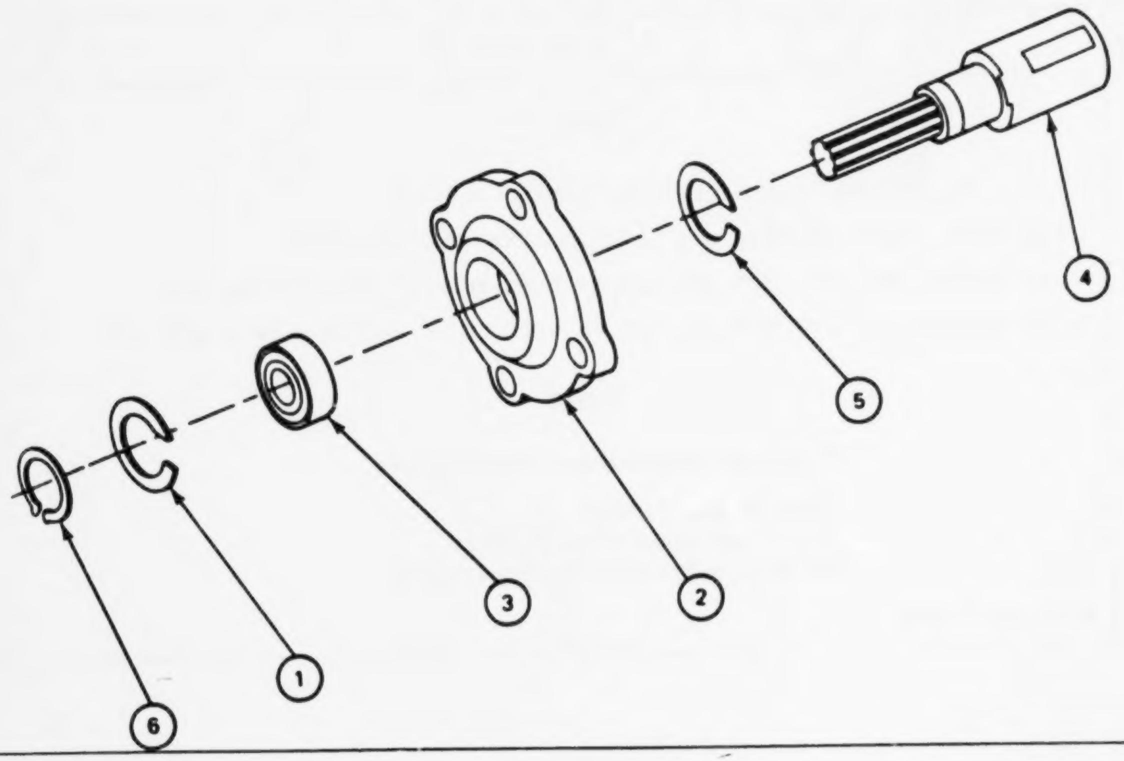
Step	Procedure
1.	Using screwdriver, put retaining ring (1) in cover (2).
2.	Using hammer and drift pin, put bearing (3) with thrust side toward shaft seat, on shaft (4).
3.	Using hands, put bearing (3) and shaft (4) in cover (2).
4.	Using screwdriver, put retaining ring (5) in cover (2).
5.	Using pliers, put retaining ring (6) on shaft (4) (JPG).

NOTE

Follow-on Maintenance Action Required:

Install cover (para 20-13).

END OF TASK



20-16. BEVEL GEAR OR HOUSING REMOVAL PROCEDURE

TOOLS: External retaining ring pliers
20 ounce ball peen hammer
3/4" drift pin
1/4" drift pin
Vise with brass caps
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

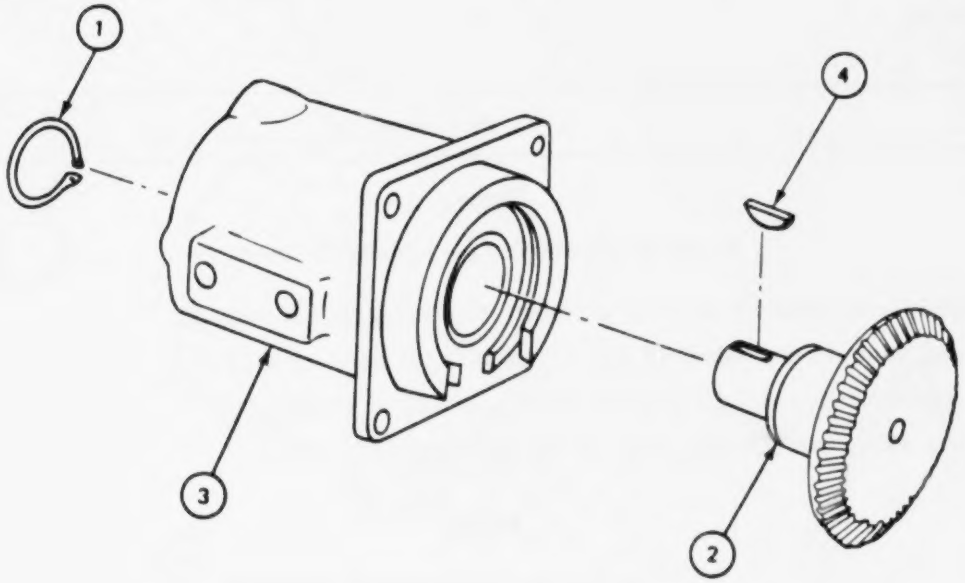
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES: Remove cover (para 20-12)
Remove shaft coupling (para 20-21)

FRAME 1

Step	Procedure
	NOTE It may be necessary to put housing (3) in vise.
1.	Using pliers, remove retaining ring (1) from bevel gear (2) (JPG).
2.	Using hammer and 3/4" drift pin, remove bevel gear (2) from housing (3).
3.	Using hammer and 1/4" drift pin, remove woodruff key (4) from bevel gear (2).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts(para 20-8).
	END OF TASK



20-17. BEVEL GEAR OR HOUSING INSTALLATION PROCEDURE

TOOLS: Internal retaining ring pliers
20 ounce ball peen hammer
3/4" drift pin
Vise with brass caps

SUPPLIES: Oil (item 18, App. A)

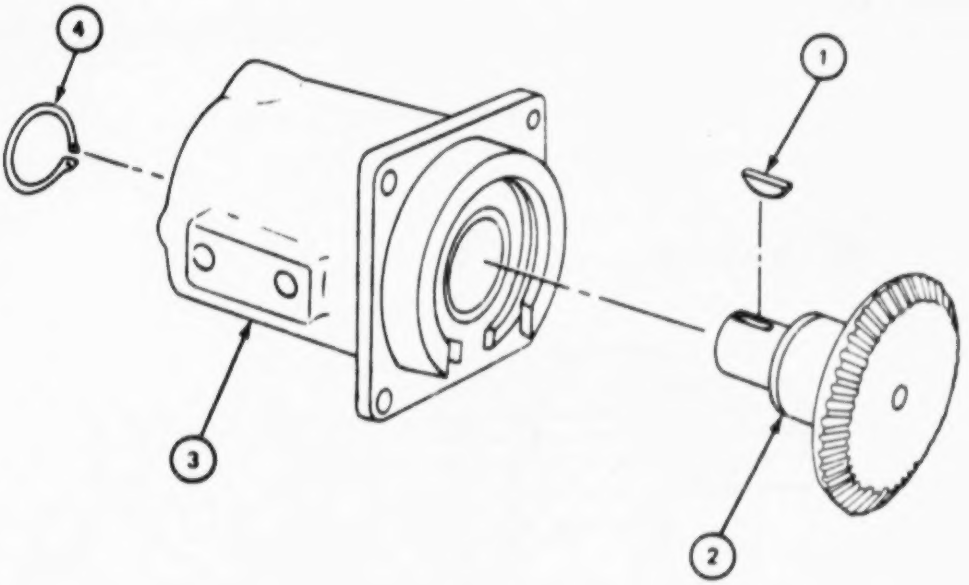
PERSONNEL: One

REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Assemble housing (para 20-20)

FRAME 1

Step	Procedure
	NOTE It may be necessary to put housing (3) in vise.
1.	Lightly coat woodruff key (1) and shaft of bevel gear (2) with oil.
2.	Using hammer, put woodruff key (1) in shaft of bevel gear (2).
3.	Using hammer and drift pin, put bevel gear (2) in housing (3).
4.	Using pliers, put retaining ring (4) on bevel gear (2) (JPG).
	NOTE Follow-on Maintenance Action Required: Install shaft coupling (para 20-22).
	END OF TASK



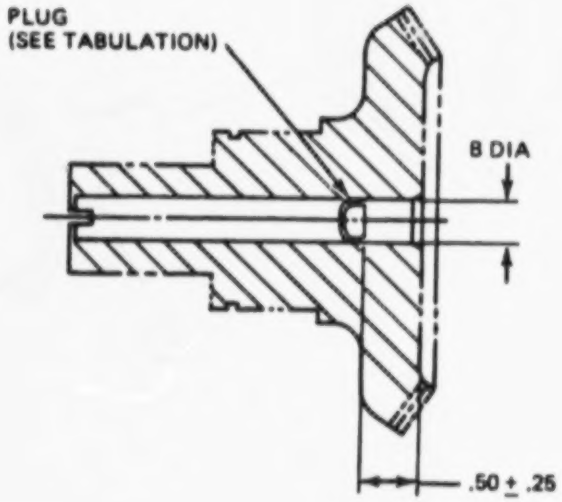
20-18. BEVEL GEAR REPAIR PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect bevel gear (para 20-8)

FRAME 1

Step	Procedure
	SUPPORT SHOP WORK
1.	Take bevel gear to shop where press, reaming, and inspection equipment are available. a. Make dimensional check. b. Install plug.
2.	After support shop work, return bevel gear to turret shop. END OF TASK



B DIA	USE PLUG	NSN
.380 OR LESS	MS9176-04	5340-00-081-6353
OVER .380	MS9176-06	5340-00-947-0152

20-19. HOUSING DISASSEMBLY PROCEDURE

TOOLS: Internal retaining ring pliers
3/4" drift pin
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES: Test no-bak (para 20-9)
Remove cover (para 20-12)
Remove shaft coupling (para 20-21)
Remove bevel gear (para 20-16)

20-19. HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 1

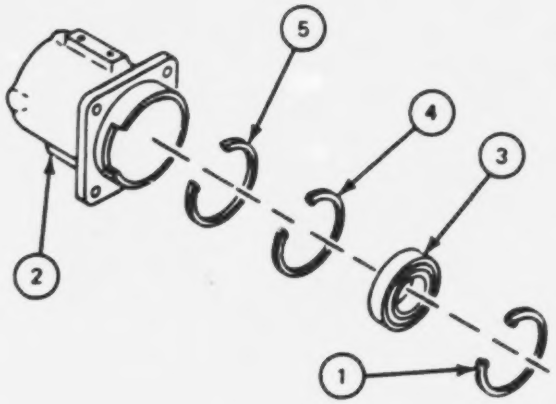
Step	Procedure
1.	Using pliers, remove retaining ring (1) from housing (2) (JPG).
2.	Using drift pin, lightly tap bearing (3) and remove from housing (2).
3.	Using pliers, remove two retaining rings (4) and (5) from housing (2) (JPG).

NOTE

Follow-on Maintenance Action Required:

Clean all parts (JPG).
Inspect and repair all parts (JPG).
Do detail inspecton of parts (para 20-8b).

END OF TASK



20-20. HOUSING ASSEMBLY PROCEDURE

TOOLS: Internal retaining ring pliers

PERSONNEL: One

REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Inspect housing (para 20-8b)

FRAME 1

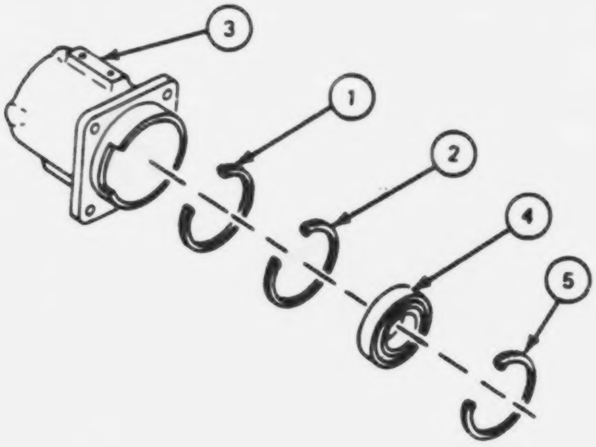
Step	Procedure
1.	Using pliers, put two retaining rings (1) and (2) in housing (3) (JPG).
2.	Using hands, put bearing (4) in housing (3).
3.	Using pliers, put retaining ring (5) in housing (3) (JPG).

NOTE

Follow-on Maintenance Action Required:

Install bevel gear (para 20-17).

END OF TASK



20-21. SHAFT COUPLING REMOVAL AND DISASSEMBLY PROCEDURE

TOOLS: Needle nose pliers
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

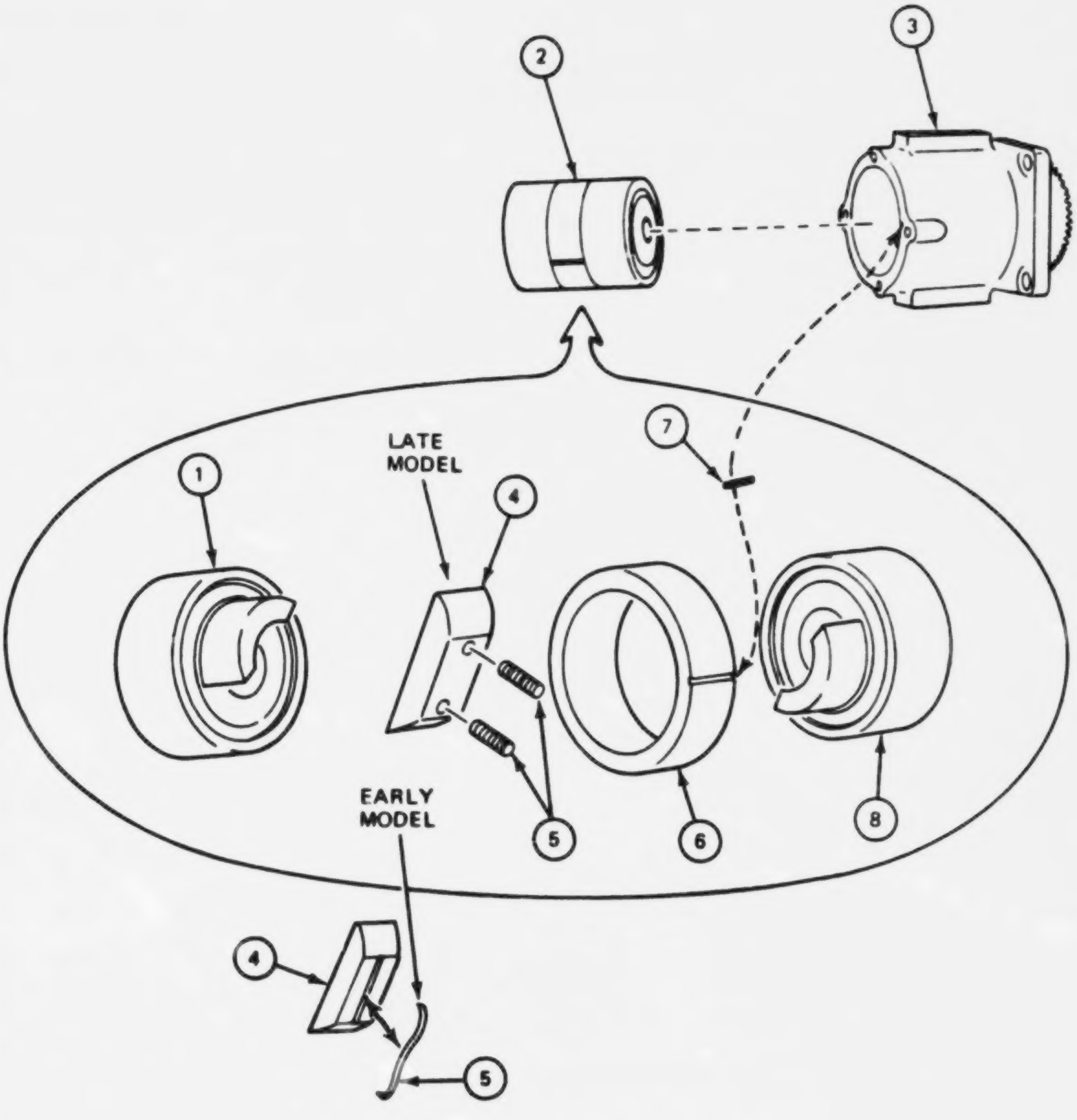
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Remove cover (para 20-12)

20-21. SHAFT COUPLING REMOVAL AND DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Driven member (1), lockring (6) and driven member (8) must be removed by pulling straight out.
1.	Using hands, pull out driven member (1) from shaft coupling (2) and housing (3).
	WARNING Be careful when removing locking bar (4) from lockring (6). Tension springs (5) may fly out and hurt you.
	NOTE Tension springs (6) consist of two coil springs in late models and four leaf-type springs in early models. Springs (5) must be compressed to remove locking bar (4).
2.	Using hands, remove locking bar (4) with tension springs (5) from lockring (6).
3.	Remove tension springs (5) from lockring bar (4).
4.	Using hands, pull lockring (6) out from housing (3).
5.	Using pliers, remove pin (7) from housing (3).
	NOTE It may be necessary to tap housing on work table to loosen driven member from housing (3).
6.	Using hands, remove driven member (8) from housing (3).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG).
	END OF TASK


LATE MODEL
EARLY MODEL

20-22. SHAFT COUPLiNG ASSEMBLY AND INSTALLATION PROCEDURE

TOOLS: 1/4" flat tip screwdriver

SUPPLIES: Grease (item 14, App. A)

PERSONNEL: One

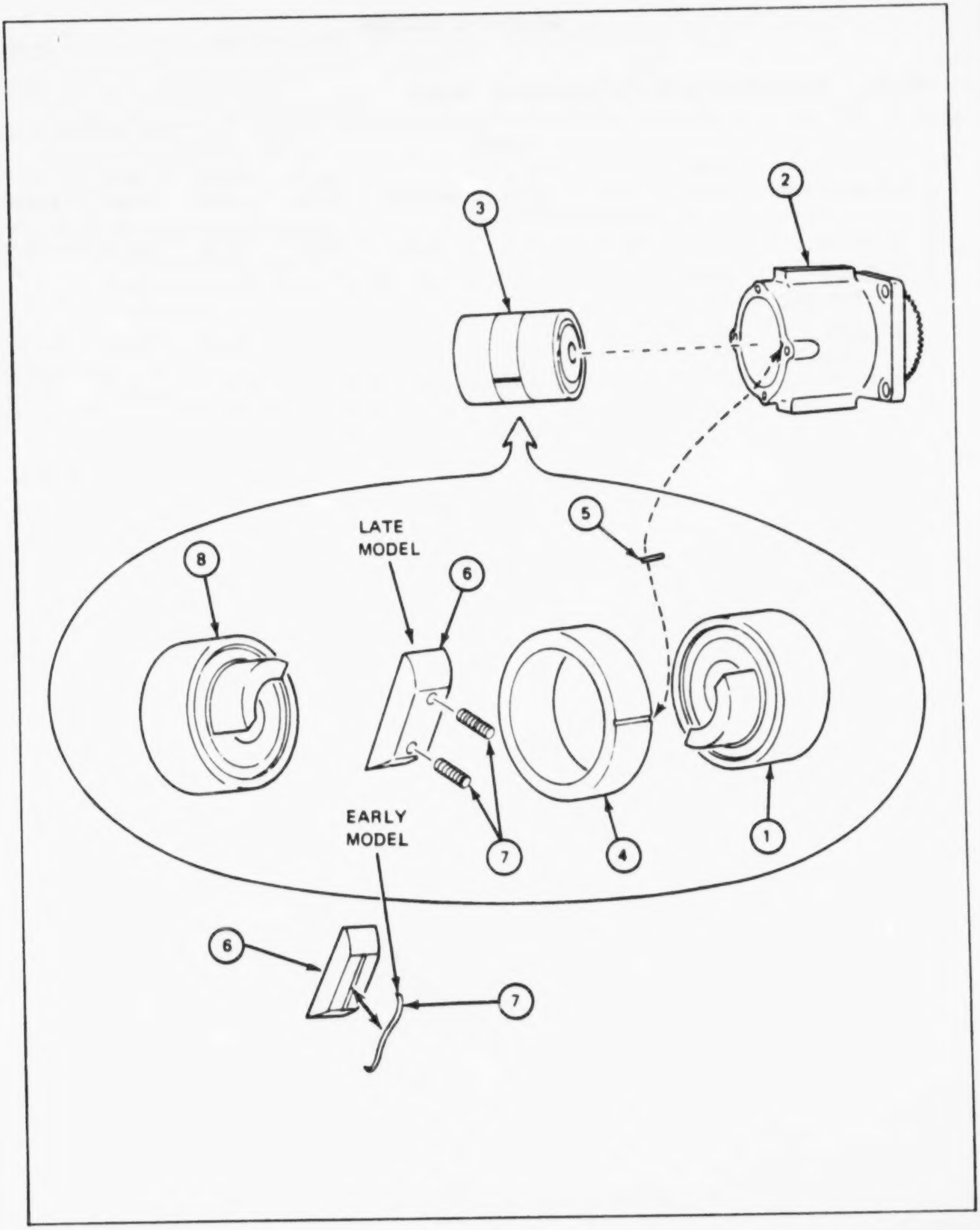
PRELIMINARY PROCEDURES: Assemble housing (para 20-20)
Install bevel gear (para 20-17)

20-22. SHAFT COUPLING ASSEMBLY AND INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Lightly coat driven member (1) and inside of housing (2) with grease.
	NOTE Driven member (1), lockring (4), and driven member (8) must be put in straight. Keyway in driven member (1) must be in line with woodruff key in shaft of housing (2).
2.	Using hands, put driven member (1) of shaft coupling (3) in housing (2).
3.	Lighly coat lockring (4) and pin (5) with grease.
4.	Using hands, align groove in lockring (4) with groove in housing (2) and put pin (5) into lock housing (2) and lockring (4) together.
5.	Using hands, put lockring (4) and pin (5) into housing (2) until touching driven member (1).
6.	Lightly coat locking bar (6) with grease.
7.	Using hands, start locking bar (6) in lockring (4).
	NOTE Tension springs (7) consist of two coil springs in late models or four leaf-type springs in early models.
8.	Put tension springs (7) in locking bar (6).
9.	Using screwdriver and hands, press or position tension springs (7) in locking bar (6) while pushing locking bar (6) into lockring (4).
10.	Lightly coat driven member (8) with grease.
11.	Using hands, put driven member (8) in housing (2).
	NOTE Follow-on Maintenance Action Required: Install cover (para 20-13).
	END OF TASK

Para 20-22 Cont


LATE
MODEL
EARLY
MODEL

]

Section 4. CLUTCH

20-23. MAINTENANCE PROCEDURES INDEX

	TASKS							
Equipment Item	Inspection	Test	Adjustment	Removal	Installation	Disassembly	Assembly	Repair
1. Clutch	. . .	20-24	20-25	20-26	20-27	20-28	20-29	. . .
2. Clutch Housing	20-30	. . .	. . .	. . .	. . .	20-31	20-32	. . .
3. Clutch Body	20-33	. . .	. . .	. . .	. . .	20-34	20-35	20-36

20-24. CLUTCH TEST PROCEDURE

TOOLS: Gear lock, 10952243
Socket, NSN 5120-00-627-8019
1/2" drive torque wrench (0-600 inch-pounds)
9/16" socket (3/8" drive)
3/8" drive ratchet

SUPPLIES: Screws (MS 90728-60) (two)
Oil (item 18, App. A)
Lint-free cloths (item 21, App. A)
Container

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove clutch (para 20-28)
Assemble clutch (para 20-31)

GENERAL INSTRUCTIONS:

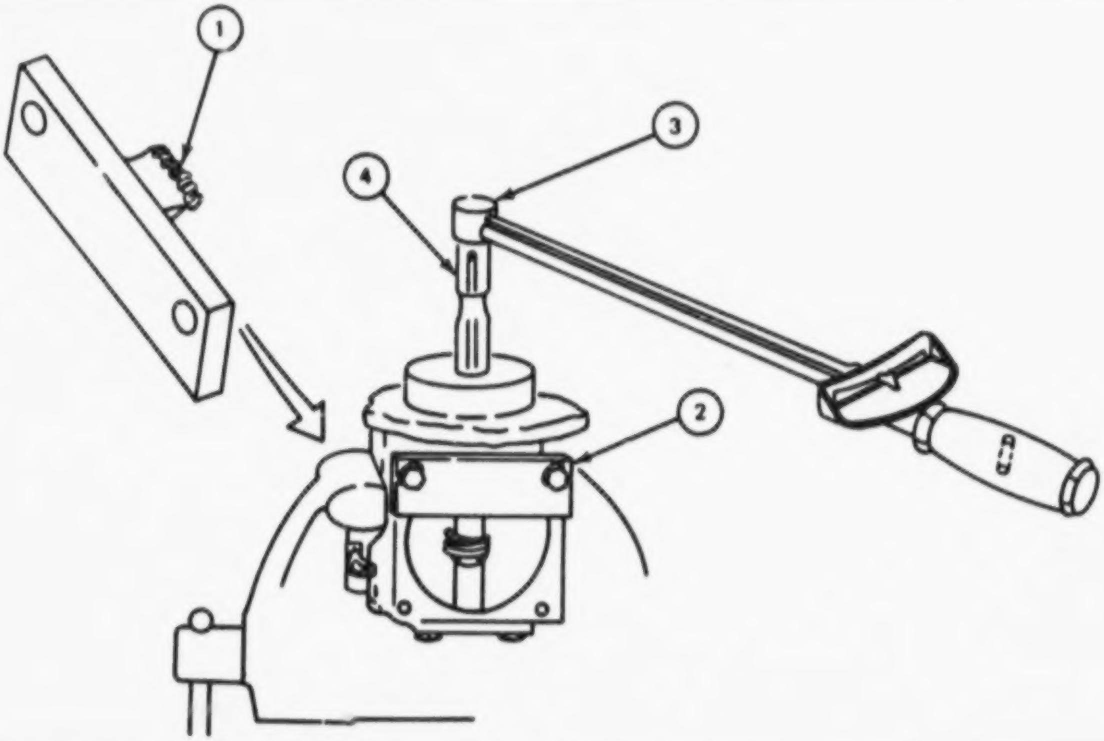
NOTE

If normal indication is not obtained, clutch is bad. Adjust clutch (para 20-27).

20-24. CLUTCH TEST PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Put clutch in container with shaft end down.
2.	Put oil into clutch housing through no-bak opening until clutch disks are thoroughly lubricated.
3.	Lock clutch in a bench vise with shaft end up.
4.	Put gear lock (1) through no-bak opening and mesh with clutch gear.
5.	Using socket wrench, put in two screws (2) holding gear lock (1) to clutch housing.
6.	Using torque wrench (3) and socket (4) on clutch shaft, pull on torque wrench and note torque reading when shaft turns. Shaft should turn at a torque between 400 and 500 inch-pounds. If shaft does not turn at specified torque, adjust clutch (para 20-27).
	NOTE
	If normal indication was obtained, clutch is good.
	END OF TASK



20-25. CLUTCH ADJUSTMENT PROCEDURE

TOOLS: Torque socket, NSN 5120-00-627-8019
1/2" drive torque wrench (0-600 inch-pounds)
3/8" drive ratchet
1-1/8" open end wrench
Spanner wrench
Vise with brass jaws
5/16" socket (3/8" drive)
7/16" socket (3/8" drive)
5/8" socket (3/8" drive)
1-1/8" deepwell socket (1/2" drive)
3/8" drive torque wrench (0-150 inch-pounds)
1/2" drive hinged handle
9/16" socket (3/8" drive)

PERSONNEL: One

PRELIMINARY PROCEDURES: Test clutch (para 20-24)

GENERAL INSTRUCTIONS:

NOTE

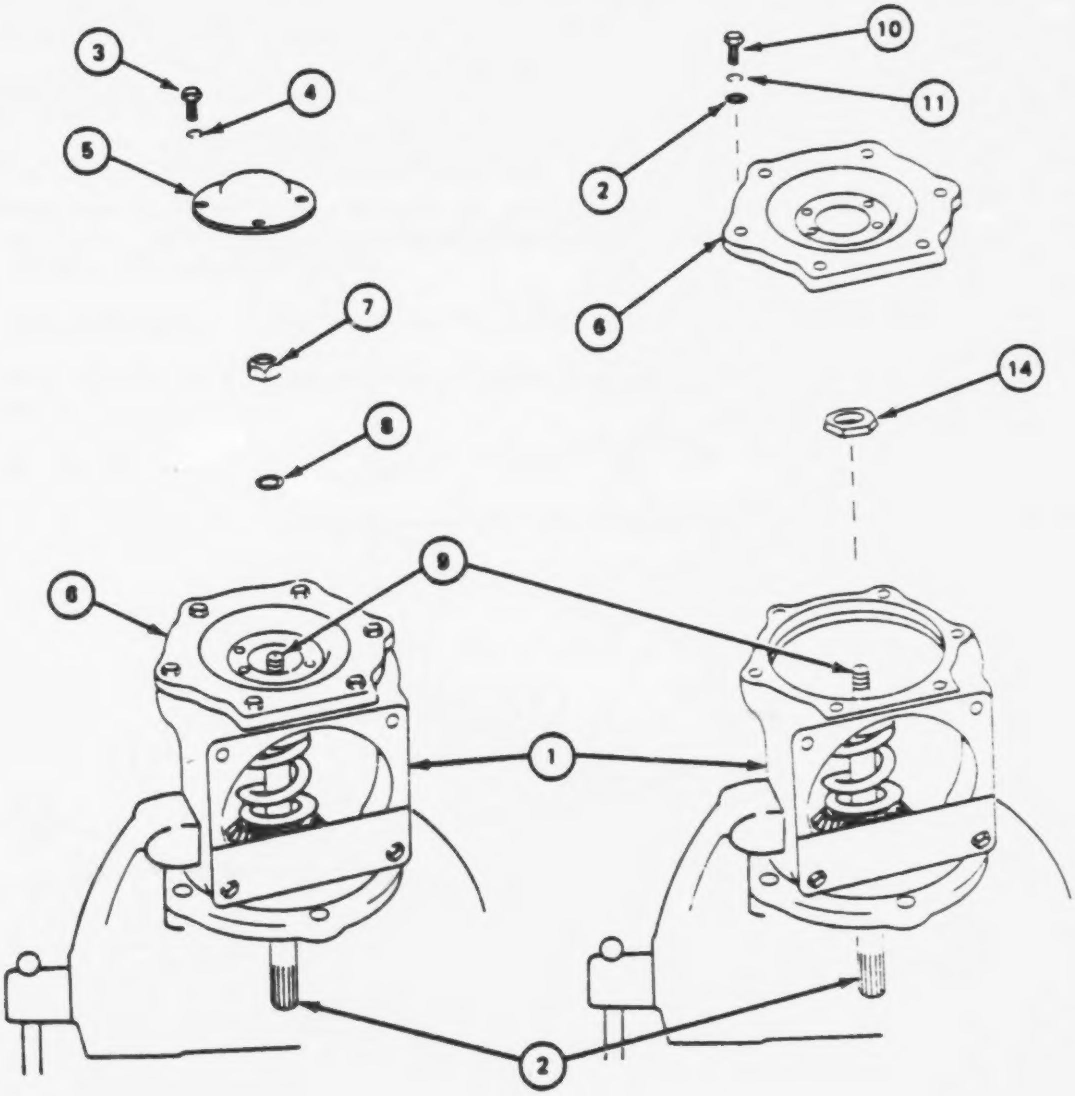
This procedure is for clutch that does not meet test requirements (para 20-24).

Adjustments needed for rebuilt clutch are done during assembly (para 20-32).

20-25. CLUTCH ADJUSTMENT PROCEDURE (CONT)

FRAME 1

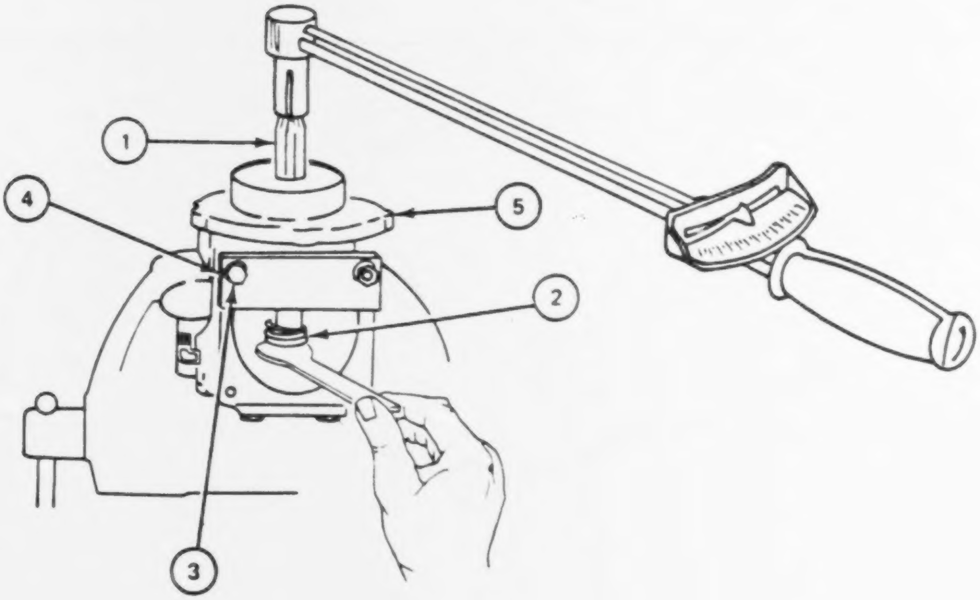
Step	Procedure
1.	Remove clutch (1) from vise and then put clutch (1) in vise with splined shaft (2) end down.
2.	Using 5/16" socket wrench, remove four screws (3) and four lockwashers (4) that attach cap (5) to housing cover (6). Remove cap.
3.	Using 5/8" socket wrench on nut (7), and torque socket with hinged handle on splined shaft (2) end, remove nut (7) and washer (8) from shaft (9).
4.	Using 7/16" socket wrench, remove six screws (10), six lockwashers (11), and six flat washers (12) that attach cover (6) to clutch (1). Remove cover.
5.	Using 1-1/8" open end wrench on nut (14), and hinged handle with torque socket on splined shaft (2) end, loosen nut (14) on shaft (9).
6.	Remove clutch (1) from vise and then put clutch in vise with splined shaft (2) end up. GO TO FRAME 2



20-25. CLUTCH ADJUSTMENT PROCEDURE (CONT)

FRAME 2

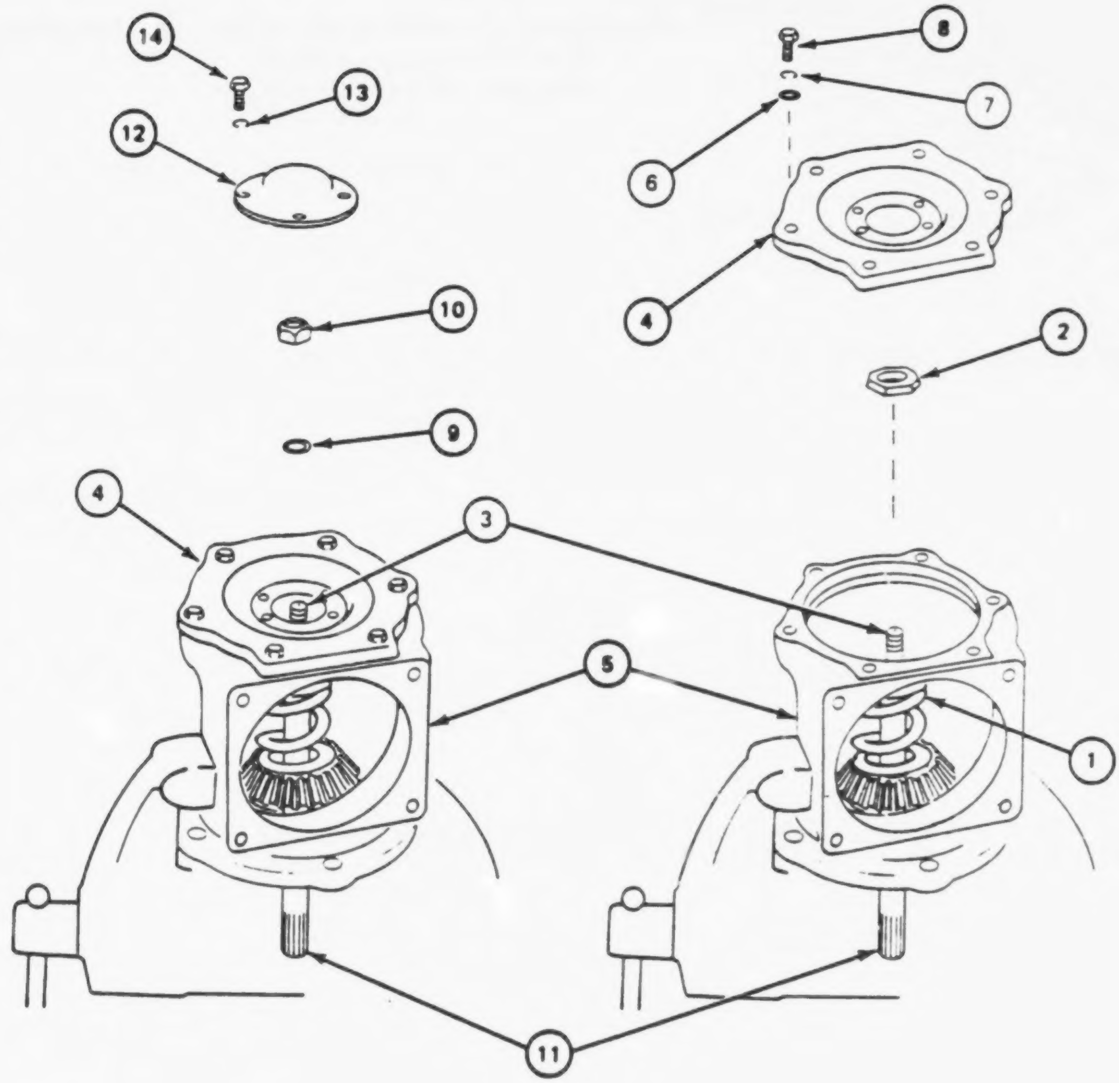
Step	Procedure
1.	Using 1/2" torque wrench with torque socket on splined shaft (1), pull on torque wrench and note torque reading when clutch shaft turns (JPG). **NOTE** Tightening spring guide (2) will increase torque reading. Loosening spring guide (2) will decrease torque reading.
2.	Using hand or spanner wrench on spring (2), and 1/2" torque wrench with torque socket on splined shaft (1), hold and adjust spring guide (2) for a torque reading on low side of 400 to 500 inch-pounds (JPG).
3.	Using 9/16" socket wrench, remove two screws (3) and gear lock (4) from clutch (5).
4.	Remove clutch (5) from vise and then put clutch in vise with splined shaft (1) end down. GO TO FRAME 3



20-25. CLUTCH ADJUSTMENT PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using spanner wrench, hold upper spring guide (1) and using 1/2" torque wrench with 1-1/8" deepwell socket, torque nut (2) on shaft (3) to between 336 and 360 inch-pounds (JPG).
2.	Using 7/16" socket wrench, attach cover (4) to clutch housing (5) with six flat washers (6), six lockwashers (7) and six screws (8).
3.	Using 3/8" drive torque wrench and 7/16" socket, torque screws (8) to between 36 and 48 inch-pounds (JPG).
4.	Using hands, put washer (9) and nut (10) on shaft (3).
5.	Using hinged handle and torque socket, hold splined shaft (11), and using 3/8" torque wrench and 5/8" socket, torque nut (10) to between 192 and 216 inch-pounds (JPG).
6.	Using 5/16" socket wrench, attach cap (12) to cover (4) with four lockwashers (13) and four screws (14). **NOTE** Follow-on Maintenance Action Required: Test clutch (para 20-24). END OF TASK



20-26. CLUTCH REMOVAL PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
3/8" drive ratchet
5/8" open end wrench
1/4" socket head screw key (Allen wrench)
7/16" combination wrench

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedures to:
Remove commander's control
Remove hand traversing drive
Remove no-bak

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Commander's Control Handle	FO-2	16
Traversing Mechanism	FO-2	14

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Commander's control removed (TM-20-2-3)
Hand traversing drive removed (TM-20-2-3)
No-bak removed (TM-20-2-3)

GENERAL INSTRUCTIONS:

CAUTION

Put plugs in tube and cap on adapter to keep out dirt. Dirt can damage equipment.

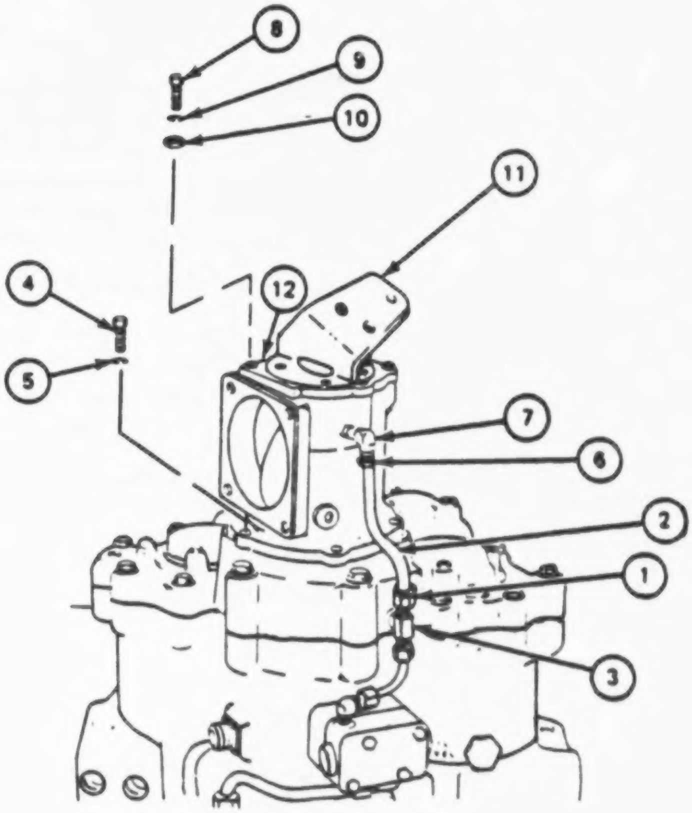
NOTE

Equipment conditions apply only if task is being done on vehicle.

20-26. CLUTCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using open end wrench, disconnect nut (1) that attaches oil tube (2) to tee fitting (3).
2.	Using Allen wrench, remove five screws (4) and five lockwashers (5) that attach clutch to traverse mechanism. Remove clutch.
3.	Using open end wrench, disconnect nut (6) that attaches oil tube (2) to elbow (7). Remove oil tube (2).
	NOTE Do steps 4, 5, and 6 only if clutch is being replaced or disassembled.
4.	Using combination wrench, remove elbow (7) from clutch housing.
5.	Using socket wrench, remove six screws (8), six lockwashers (9), and six flat washers (10) that attach bracket (11) to clutch cover (12). Remove bracket (11).
6.	Using socket wrench, put in six screws (8), six lockwashers (9), and six flat washers (10) that attach clutch cover (12) to clutch housing.
	END OF TASK



20-27. CLUTCH INSTALLATION PROCEDURE

TOOLS: 6" extension (3/8" drive)
7/16" socket (3/8" drive)
3/8" drive ratchet
3/8" drive torque wrench (0 to 50 foot-pounds)
1/4" hex head socket (3/8" drive)
5/8" open end wrench
7/16" combination wrench

SUPPLIES: Oil (item 18, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to use torque wrench.
TM 9-2350-257-10 for procedure to traverse turret
TM 9-2350-257-20-2-3 for procedures to:
- Install no-bak
- Install hand traversing drive
- Install commander's control

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Turret Traversing Mechanism	FO-2	14
Turret Traverse Lock	FO-4	6

EQUIPMENT CONDITION: Turret traverse lock set to LOCKED
Driver's master control panel MASTER BATTERY switch set to OFF

PRELIMINARY PROCEDURES: Assemble clutch (para 20-29)
Test clutch (para 20-24)

GENERAL INSTRUCTIONS:

NOTE

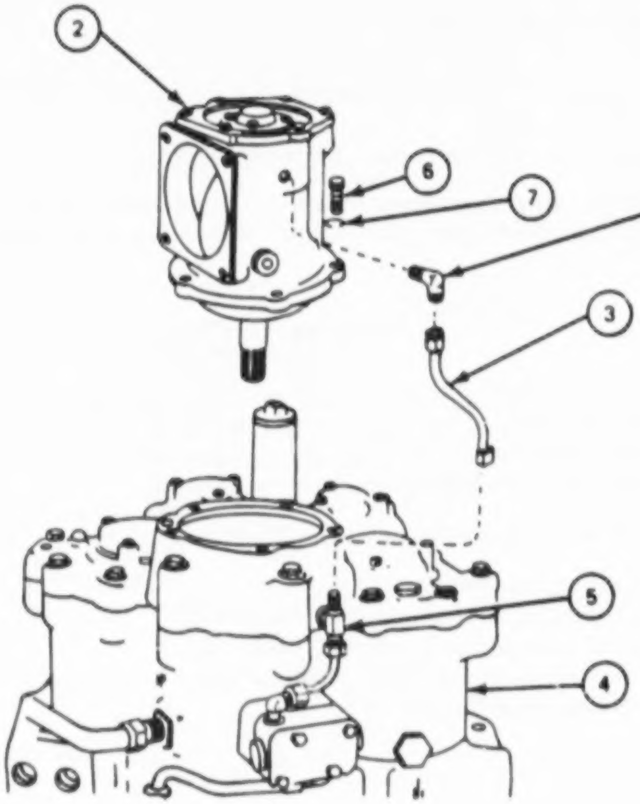
Remove plug from table and cap from adapter. For clutch to work properly, part numbers of clutch, no-bak, traversing gear box and hand traversing drive must match part numbers as follows:

Traversing Gear Box	Clutch	No-bak	Hand Traversing Drive
11637204	7972927	10940697	11674019
11637204-1	7972947-1	10951651	10911418-4

20-27. CLUTCH INSTALLATION PROCEDURE (CONT)

FRAME 1

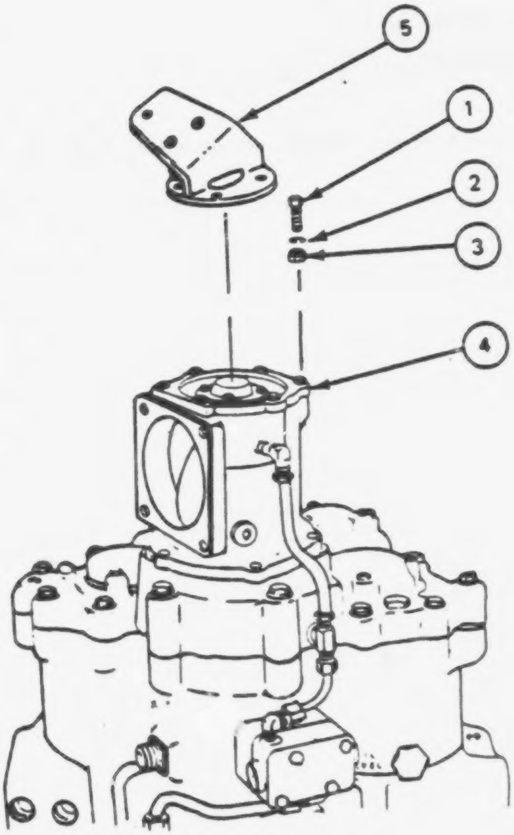
Step	Procedure
	NOTE Do step 1 if new clutch is to be installed.
1.	Using combination wrench, put elbow (1) on clutch (2) housing.
2.	Using hands, connect oil tube (3) to elbow (1). Do not tighten tube nut.
3.	Lightly coat clutch (2) shaft and inside of traversing mechanism (4) housing with oil.
4.	Using hands, put clutch (2) on traversing mechanism (4) while lining up oil tube (3) with tee fitting (5).
5.	Using hands, connect oil tube (3) to tee fitting (5). Do not tighten tube nut.
6.	Using torque wrench with hex head socket and extension, attach clutch (2) to traversing mechanism (4) with five screws (6) and five lockwashers (7). Torque screws (6) to between 4 and 6 foot-pounds (JPG).
7.	Using open end wrench, tighten two nuts on oil tube (3). GO TO FRAME 2



20-27. CLUTCH INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
	NOTE Do steps 1 and 2 if commander's control handle mounting bracket is not installed.
1.	Using socket wrench, remove six screws (1), six lockwashers (2), and six flat washers (3) holding cover (4) to clutch housing.
	NOTE Do not re-use six flat washers (3).
2.	Using torque wrench, attach mounting bracket (5) and cover (4) to clutch housing with six screws (1) and six lockwashers (2). Torque screws (1) to between 4 and 6 foot-pounds (JPG).
	NOTE Do the following tasks if this procedure completes the maintenance of the traversing mechanism system. If other maintenance must be done, make sure following tasks are completed after other maintenance. Follow-on Maintenance Action Required: Install no-bak (TM-20-2-3). Install hand traversing drive (TM-20-2-3). Install commander's control (TM-20-2-3). Traverse turret in power mode to make sure clutch is working properly (TM-10).
	END OF TASK



20-28. CLUTCH DISASSEMBLY PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove clutch (para 20-26)
Test clutch (para 20-24)

FRAME 1

Step	Procedure
1.	Disassemble clutch housing (para 20-31).
2.	Disassemble clutch body (para 20-34).
	END OF TASK

20-29. CLUTCH ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble clutch body (para 20-35).
2.	Assemble clutch housing (para 20-32).
	NOTE Follow-on Maintenance Action Required: Test clutch (para 20-24).
	END OF TASK

20-30. CLUTCH HOUSING INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble clutch housing (para 20-31).

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

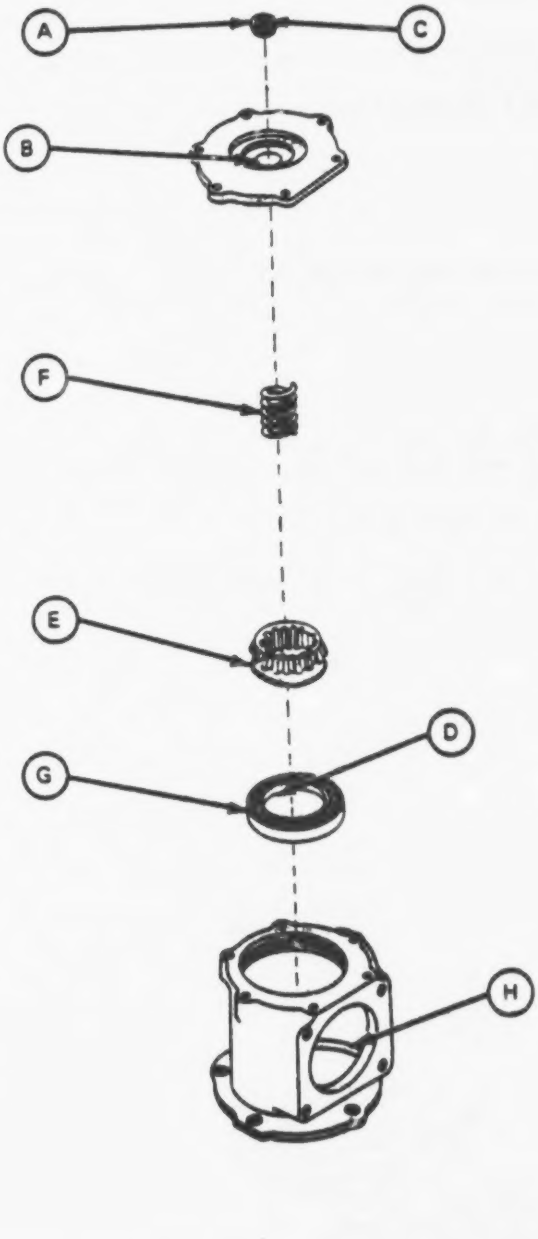
Step	Procedure
	SUPPORT SHOP WORK
1.	Take clutch housing parts to shop where inspection equipment and spring tester are available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	OD of bearing	1.1019 to 1.1024
B	ID of housing cover	1.1023 to 1.1028
C	ID of bearing	0.4721 to 0.4724
D	ID of bearing	2.2495 to 2.2500
E	OD of gear shoulder	2.2485 to 2.2490
F	Free length of spring	2.000
F	Load required to compress spring to 1.625	345 to 415 lb
G	OD of bearing	2.9365 to 2.9370
H	ID of clutch housing	2.9375 to 2.9380

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return clutch housing parts to turret shop.
	END OF TASK


A
C
B
F
E
D
G
H

20-31. CLUTCH HOUSING DISASSEMBLY PROCEDURE

TOOLS:
- 5/16" socket (3/8" drive)
- 7/16" socket (3/8" drive)
- 5/8" socket (3/8" drive)
- 3/8" drive ratchet
- 1-1/8" combination wrench
- 1/4" flat tip screwdriver
- Hook type spanner wrench
- 1/2" drift pin
- 20 ounce ball peen hammer
- 1/2" drive hinged handle
- Torque socket (NSN 5120-00-627-8019)
- Scraper
- Stiff bristled brush
- Fine stone

SUPPLIES:
- Dry cleaning solvent (item 33, App. A)
- Crocus cloth (item 7, App A)

PERSONNEL: One

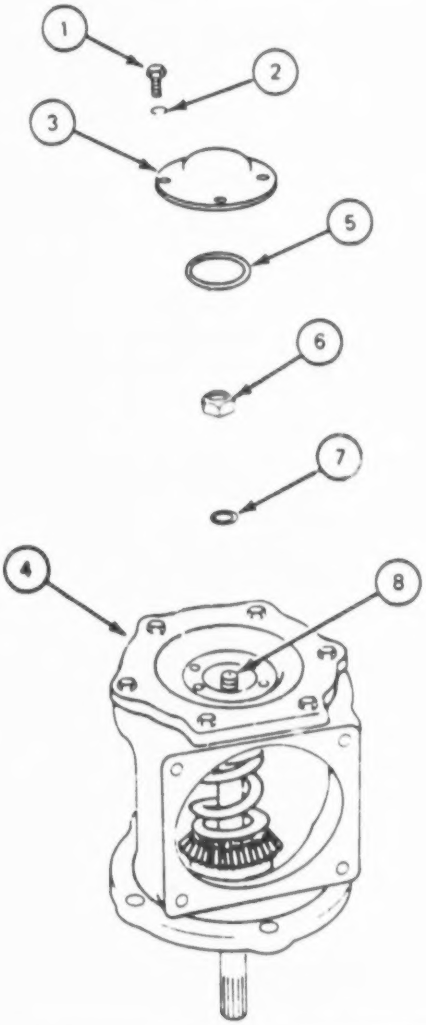
REFERENCES: JPG for procedures to:
- Remove preformed packing
- Clean parts
- Inspect and repair parts

PRELIMINARY PROCEDURES:
- Remove clutch (para 20-26)
- Test clutch (para 20-24)

20-31. CLUTCH HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 1

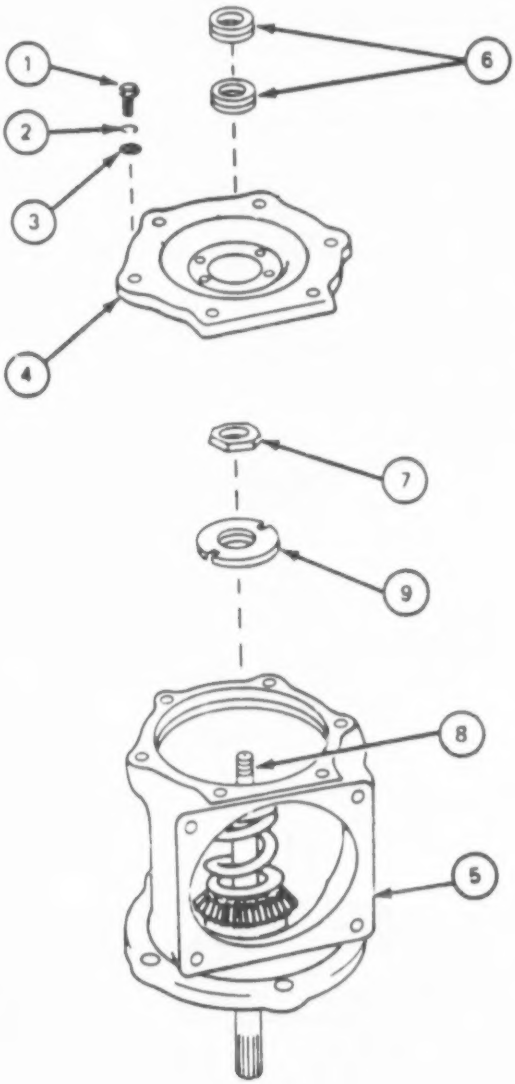
Step	Procedure
1.	Using 5/16'' socket wrench, remove four screws (1) and four lockwashers (2) that attach cap (3) to housing cover (4). Remove cap.
2.	Remove preformed packing (5) from cap (3) (JPG).
3.	Using 5/8'' socket wrench and torque socket with hinged handle on spline end, remove nut (6) and washer (7) from shaft (8).
	GO TO FRAME 2



20-31. CLUTCH HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 2

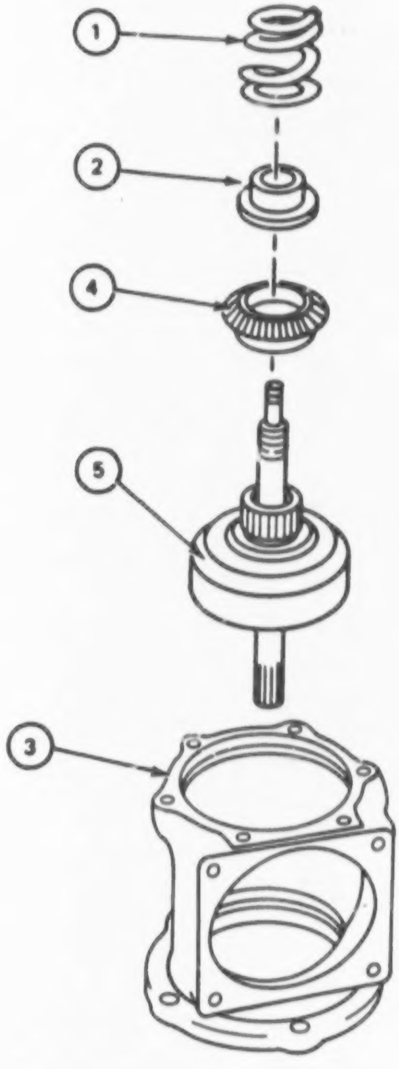
Step	Procedure
1.	Using 7/16" socket wrench, remove six screws (1), six lockwashers (2), and six flat washers (3) that attach cover (4) to housing (5). Remove cover. **NOTE** Dual bearing (6) consists of two bearings.
2.	Using drift pin, lightly tap and remove dual bearing (6) from cover (4).
3.	Using 1-1/8" wrench and hinged handle with torque socket on splined end of shaft (8), remove nut (7) from shaft.
4.	Using spanner wrench, remove upper spring guide (9) from shaft (8). GO TO FRAME 3



20-31. CLUTCH HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 3

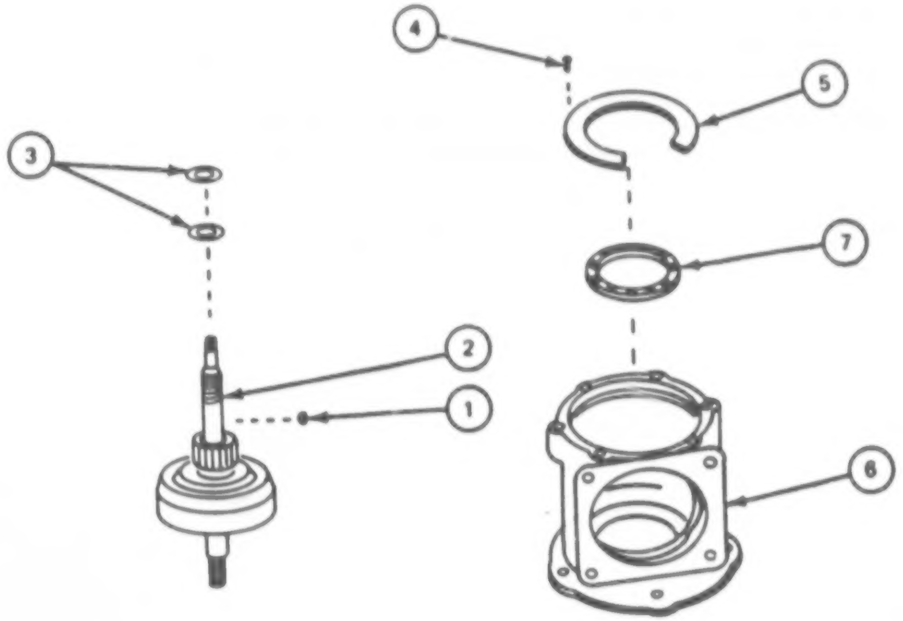
Step	Procedure
1.	Using hands, remove spring (1) and lower spring guide (2) from housing (3).
2.	Using hands, remove gear (4) and assembled clutch body and shaft (5) from housing (3). GO TO FRAME 4



20-31. CLUTCH HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 4

Step	Procedure
1.	Using hammer and drift pin, remove woodruff key (1) from shaft (2).
2.	Using hands, remove two washers (3) from shaft (2).
3.	Using screwdriver, remove four screws with assembled washers (4) that attach plate (5) to housing (6). Remove plate.
4.	Using hammer and drift pin, lightly tap and remove bearing (7) from housing (6).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-30).
	END OF TASK



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE

TOOLS: 3 ounce brass hammer
Gear lock (10952243)
Torque socket (NSN 5120-00-627-8019)
5/16" socket (3/8" drive)
7/16" socket (3/8" drive)
9/16" socket (3/8" drive)
5/8" socket (3/8" drive)
1-1/8" deepwell socket (1/2" drive)
3/8" drive ratchet
1/4" flat tip screwdriver
3/8" drive torque wrench (0 to 150 inch-pounds)
Plastic face hammer
1/2" drive torque wrench (0 to 600 inch pounds)
Spanner wrench
Hinged handle (1/2" drive)
Vise with brass jaws

SUPPLIES: Oil (item 18, App. A)
Screws (MS 90728-60) (two)
Preformed packing (MS 28775-216)
Container
Rags (item 21, App. A)

PERSONNEL: One

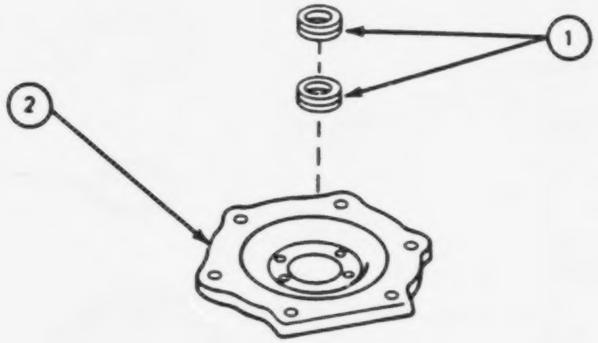
REFERENCES: JPG for procedures to:
Use torque wrench
Install preformed packing

PRELIMINARY PROCEDURES: Inspect clutch housing (para 20-30)
Assemble clutch body (para 20-35)

20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Word "THRUST" is marked on two bearings (1) and must be facing outward.
1.	Using plastic face hammer, put two bearings (1) in cover (2). GO TO FRAME 2



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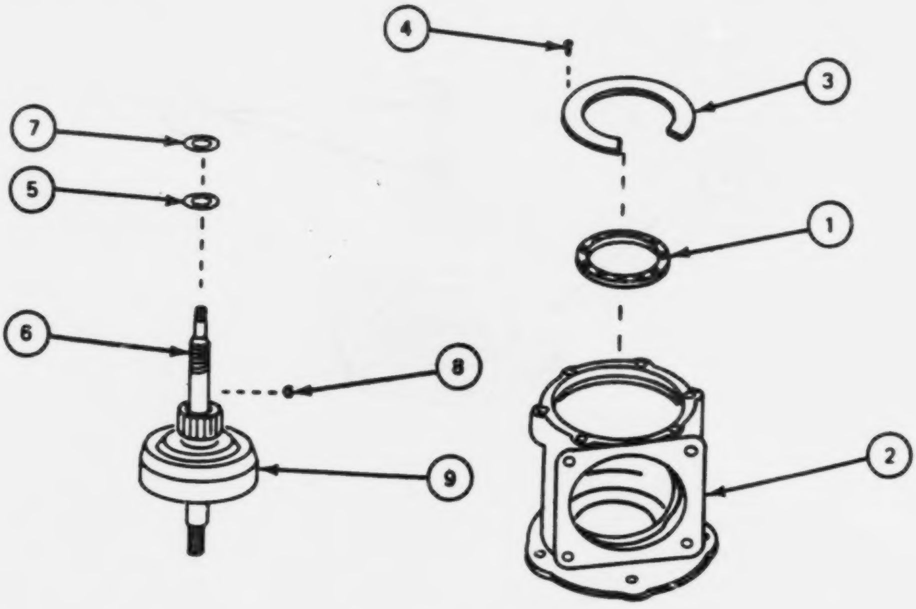
20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 2

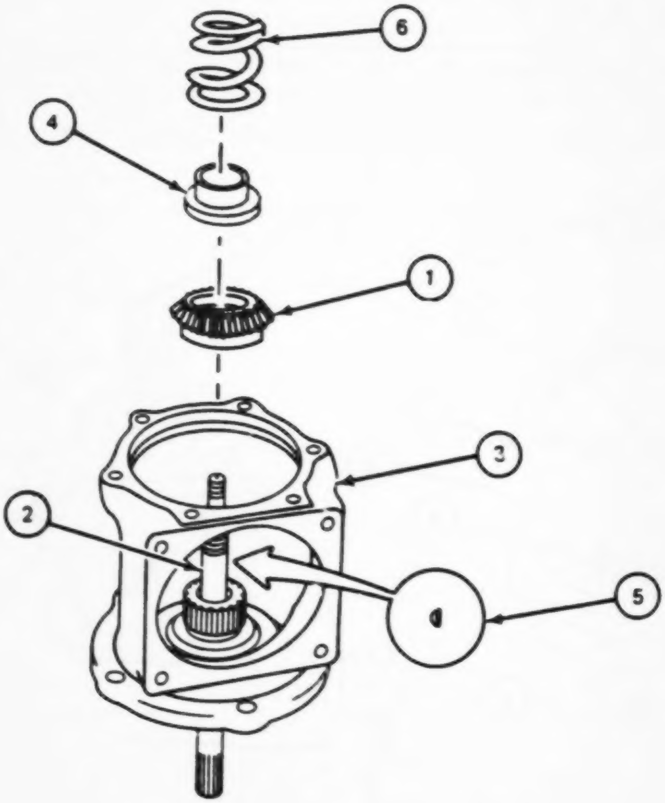
Step	Procedure
1.	Using plastic face hammer, lightly tap bearing (1) into housing (2).
2.	Using screwdriver, attach bearing plate (3) to housing (2) with four screws and assembled washers (4).
3.	Using hands, put steel washer (5) on shaft (6).
4.	Using hands, put brass washer (7) on shaft (6).
5.	Using brass hammer, lightly tap woodruff key (8) in shaft (6).
6.	Using hands, put assembled clutch body (9) in housing (2).
	GO TO FRAME 3



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 3

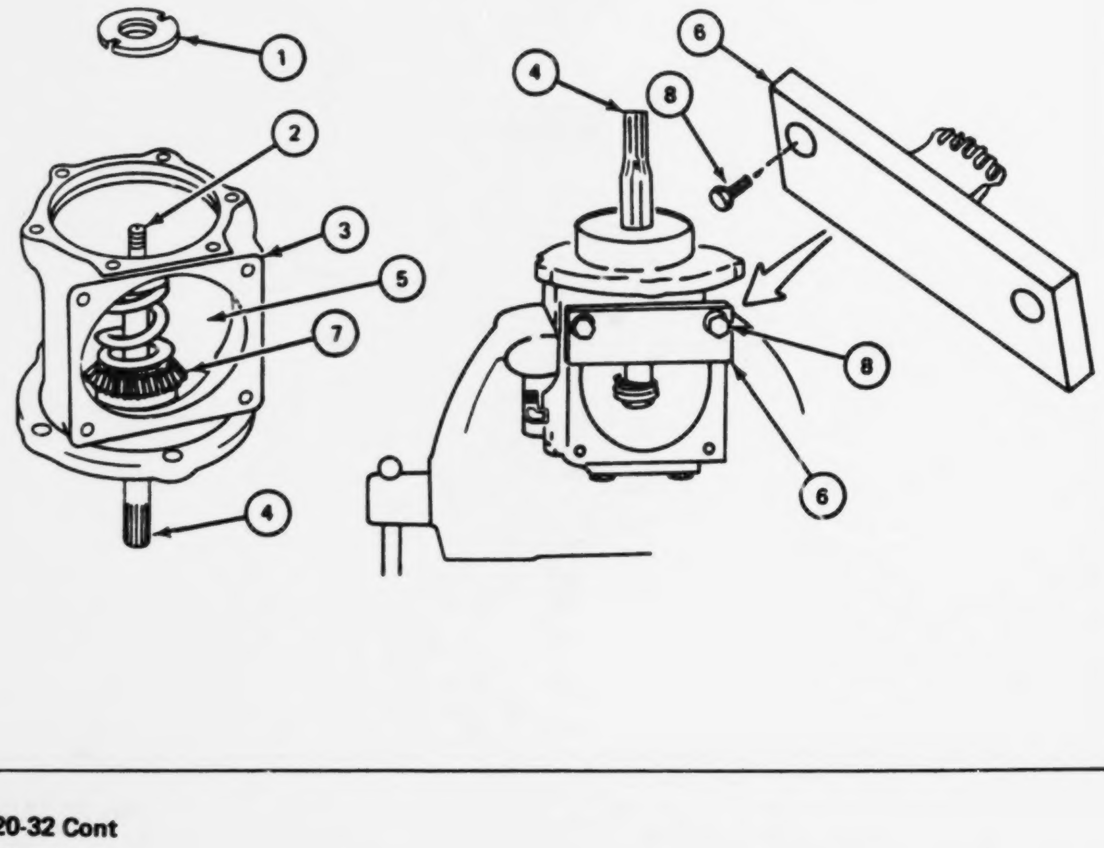
Step	Procedure
1.	Using hands, align splines in gear (1) with splines on shaft (2).
2.	Using hands, put gear (1) on shaft (2) and seat bearing in housing (3).
3.	Using hands, align spring guide (4) with woodruff key (5).
4.	Put spring guide (4) on shaft (2).
5.	Using hands, put spring (6) on spring guide (4) in housing (3). GO TO FRAME 4



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 4

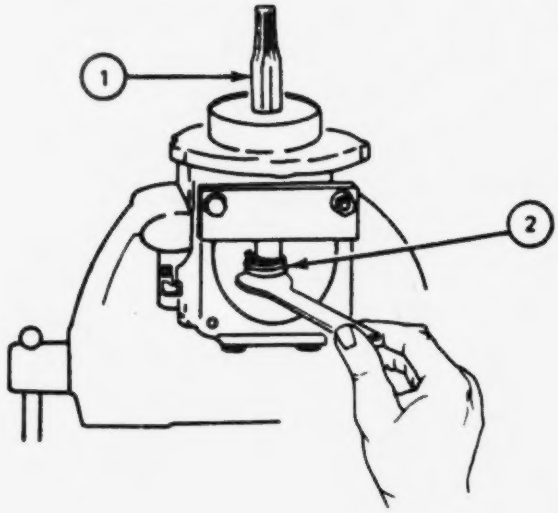
Step	Procedure
1.	Using hands, screw upper spring guide (1) on shaft (2).
2.	Put clutch housing (3) in a container with splined shaft (4) end down.
3.	Put oil into clutch housing (3) through no-bak opening (5) until clutch disks are thoroughly lubricated.
4.	Using hands, lock clutch housing (3) in a bench vise with splined shaft (4) end up.
5.	Using hands, put gear lock (6) through no-bak opening (5) and mesh with clutch gear (7).
6.	Using 9/16" socket wrench, attach gear lock (6) to clutch housing (3) with two screws (8).
	GO TO FRAME 5



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 5

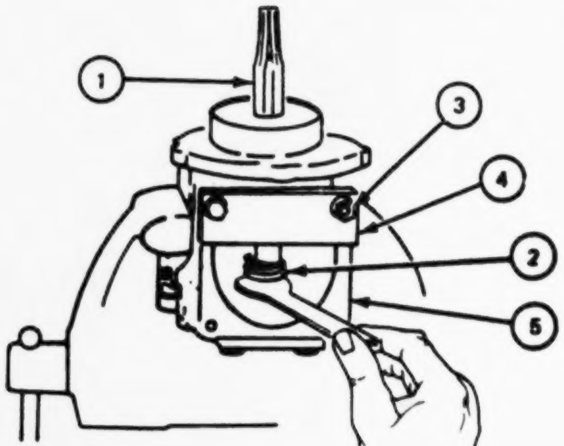
Step	Procedure
	NOTE Do steps 1, 2, and 3 only if new disks are installed. Otherwise, go to frame 6.
1.	Using 1/2" torque wrench with torque socket on clutch shaft (1), pull on torque wrench and note torque reading when clutch shaft turns (JPG).
	NOTE Tightening spring guide (2) will increase torque reading, while loosening spring guide will decrease torque reading.
2.	Using hand or spanner wrench and 1/2" torque wrench with torque socket, hold and adjust spring guide (2) for a torque reading of about 150 inch-pounds (JPG).
3.	Using hinged handle and torque socket, turn clutch shaft (1) 30 turns to seat disks.
	GO TO FRAME 6



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 6

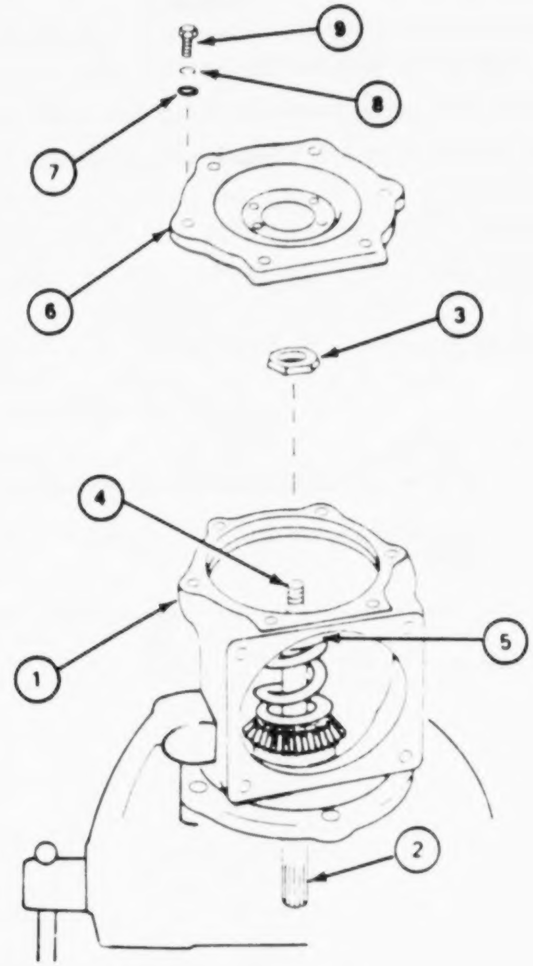
Step	Procedure
1.	Using 1/2" torque wrench with torque socket on splined shaft (1), pull on torque wrench and note torque reading when clutch shaft (1) turns (JPG). **NOTE** Tightening spring guide (2) will increase torque reading, while loosening spring guide will decrease torque reading.
2.	Using hand or spanner wrench and 1/2" torque wrench with torque socket, hold and adjust spring guide (2) for a torque reading on low side of 400 to 500 inch-pounds (JPG).
3.	Using 9/16" socket wrench, remove two screws (3) that attach gear lock (4) to clutch housing (5). Remove gear lock.
4.	Remove clutch housing (5) from vise. GO TO FRAME 7



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 7

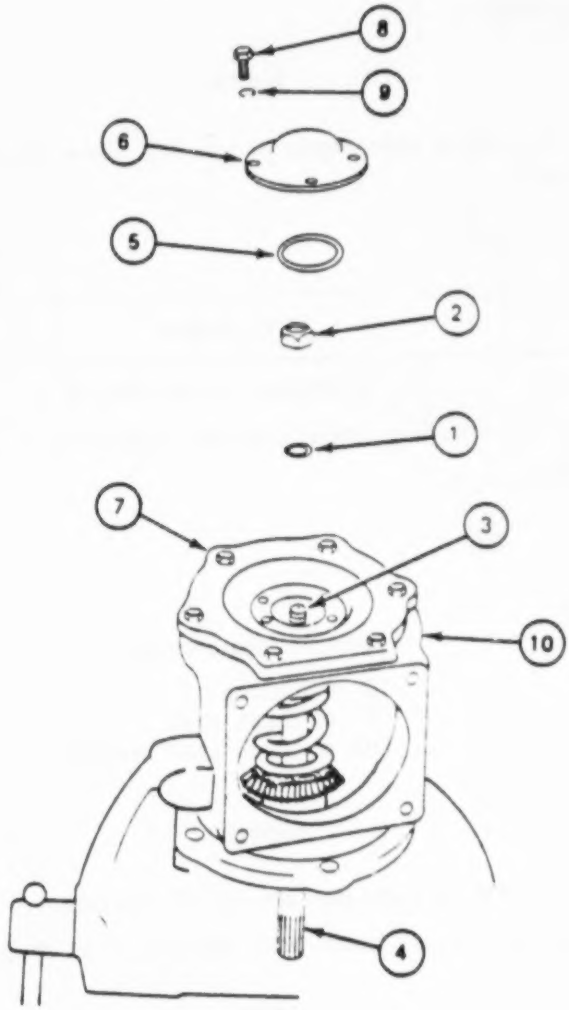
Step	Procedure
1.	Using hands, lock clutch housing (1) in vise with splined shaft (2) down.
2.	Using hands, put nut (3) on shaft (4).
3.	Using spanner wrench, hold upper spring guide (5) during step 4.
4.	Using 1/2" torque wrench with 1-1/8" deepwell socket, torque nut (3) to between 336 and 360 inch-pound (JPG).
5.	Using 7/16" socket wrench, attach cover (6) to clutch housing (1) with six flat washers (7) and six lockwashers (8) and six screws (9).
6.	Using 3/8" torque wrench with 7/16" socket, torque screws (9) to between 36 and 48 inch-pounds (JPG).
	GO TO FRAME 8



20-32. CLUTCH HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 8

Step	Procedure
1.	Using hands, put washer (1) and nut (2) on shaft (3).
2.	Using hinged handle with torque socket, hold splined shaft (4) during step 3.
3.	Using 3/8" torque wrench with 5/8" socket, torque nut (2) to between 192 and 216 inch-pounds (JPG).
4.	Put preformed packing (5) in cap (6) (JPG).
5.	Using 5/16" socket wrench, attach cap (6) to cover (7) with four screws (8) and four lockwashers (9).
6.	Remove clutch housing assembly (10) from vise.
	NOTE Follow-on Maintenance Action Required: Test clutch (para 20-24).
	END OF TASK



20-33. CLUTCH BODY INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble clutch housing (para 20-31)
Disassemble clutch body (para 20-34)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

Step	Procedure
	SUPPORT SHOP WORK
1.	Take clutch body parts to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	ID of bushing	0.752 to 0.755
B	OD of clutch shaft	0.750 to 0.751
C	OD of clutch shaft shoulder	0.4711 to 0.4716

NOTE

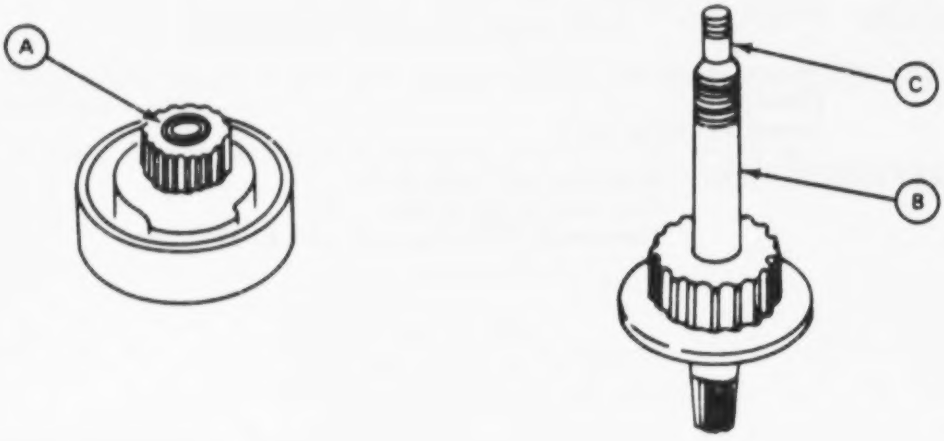
Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return clutch body parts to turret shop.

NOTE

If bushing measurement is out of tolerance, replace bushing (para 20-36).

END OF TASK


A
C
B

20-34. CLUTCH BODY DISASSEMBLY PROCEDURE

TOOLS: Scraper
Stiff bristled brush
Fine stone

SUPPLIES: String or wire, 1 foot long
Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

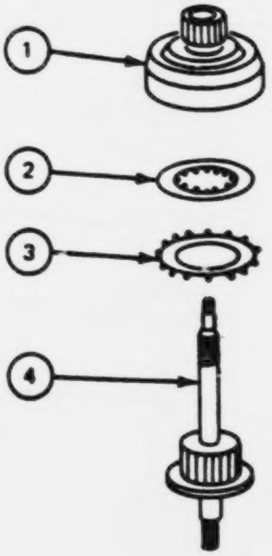
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Remove clutch (para 20-26)
Test clutch (para 20-24)
Disassemble clutch housing (para 20-32).

20-34. CLUTCH BODY DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Stack clutch disks in order in which removed. If re-used, disks must be reinstalled in same order.
1.	Using hands, remove clutch body (1), seven inner disks (2), and eight outer disks (3) from shaft (4).
2.	Tie disks together with wire or string, so they won't get mixed up.
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-33).
	END OF TASK



20-35. CLUTCH BODY ASSEMBLY PROCEDURE

TOOLS: 1/4" flat tip screwdriver

SUPPLIES: Oil (item 18, App. A)

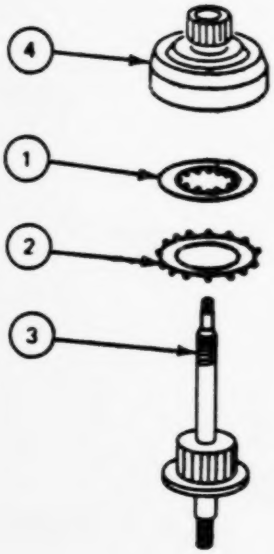
PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect clutch body (para 20-33).

20-35. CLUTCH BODY ASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE The inner disks (1) and outer disks (2) make up a matched disk set. If being reused, disks must be installed in the order which removed. There are seven inner disks and eight outer disks.
1.	Lightly coat inner and outer disks (1) and (2) with oil.
2.	Put disks on shaft (3) starting with outer disks (2), then inner disk (1) and continue until all disks are on shaft.
3.	Using screwdriver to align disks, put shaft (3) into clutch body (4).
	NOTE Follow-on Maintenance Action Required: Assemble clutch housing (para 20-32).
	END OF TASK



20-36. CLUTCH BODY REPAIR PROCEDURE

SUPPLIES: Bushing (MS 35794-67)

PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect parts (para 20-33).

GENERAL INSTRUCTIONS:

NOTE

Procedure is used to replace bad bushing in clutch body. If clutch body is bad, order repair part or next higher assembly as required.

20-36. CLUTCH BODY REPAIR PROCEDURE (CONT)

FRAME 1

Step	Procedure
	SUPPORT SHOP WORK
1.	Take clutch body and new bushing to shop where bearing press, precision measuring equipment, and reaming equipment are available. a. Remove bad bushing. b. Make dimensional check.

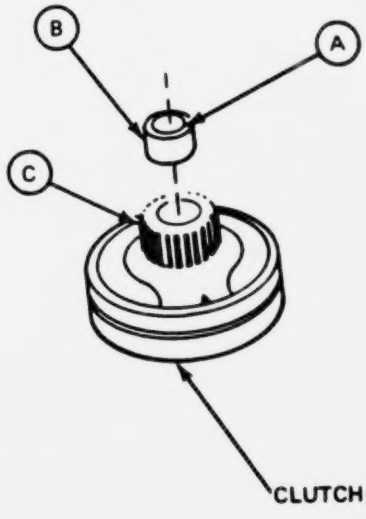
Reference Letter	Point of Measurement	Measurement
A	ID of bushing	0.752 to 0.753
B	OD of bushing	0.8745 to 0.8755
C	ID of body gear	0.8745 to 0.8755

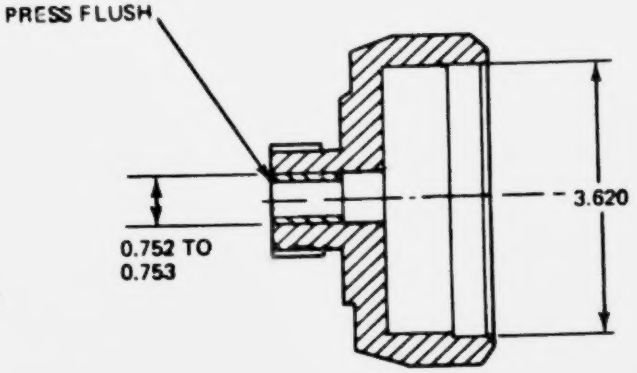
c. Install new bushing. Press flush with body gear.

d. Make bushing installation measurement. Center of bushing must be in line with center of major inside diameter (3.620") within 0.0015". Ream bushing, if required.

2. After support shop work, return clutch body to turret shop.

END OF TASK





Section 5. HYDRAULIC MOTOR

20-37. MAINTENANCE PROCEDURES INDEX

		Tasks				
Equipment Item	Inspection	Test	Removal	Installation	Disassembly	Assembly
Hydraulic Motor	20-38	20-39	20-40	20-41	20-42	20-43

20-38. HYDRAULIC MOTOR INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble hydraulic motor (para 20-42).

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

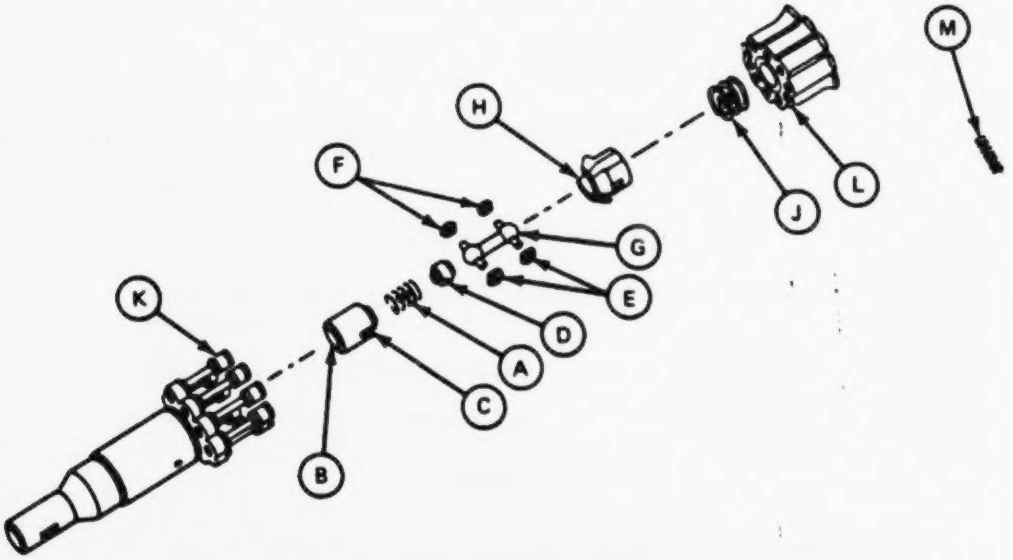
Step	Procedure
	SUPPORT SHOP WORK
1.	Take hydraulic motor parts to shop where inspection equipment and spring tester are available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	Spring-free length load at 0.280 in	0.700 to 0.812 4.3 lbs
B	ID of retainer	0.571 to 0.592
C	Width of slot in retainer	0.4459 to 0.4464
D	OD of bearing	0.548 to 0.569
E	Width of knuckle (four)	0.4448 to 0.4450
F	ID of pin hole in knuckle (four)	0.2199 to 0.2206
G	OD of pin	0.2106 to 0.2197
H	Width of slot in retainer	0.4457 to 0.4462
J	Spring-free length load at 0.630 in	0.800 to 0.942 12.5 lbs
K	OD of piston (before fitting)	0.408 to 0.409
L	ID of bore in motor block (before fitting)	0.4062 to 0.4066
M	Spring-free length load at 1.046 in	1.24 to 132 lbs

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return hydraulic motor parts to turret shop.
	END OF TASK


M
H
F
G
E
D
A
C
K
B
J
L

20-39. HYDRAULIC MOTOR TEST PROCEDURE

TEST EQUIPMENT: Constant displacement pump
10-micron filter
Pressure regulator
Tachometer
Pressure gauge
Two-way control valve
Shutoff valve (three)
Dynamometer
125 psi check valve
Flow meter (two)
Temperature gauge
Watch
Measuring beaker (100 cubic centimeters)

SUPPLIES: Hydraulic fluid (item 10, App. A)
Lint-free cloths (item 21, App. A)
Pencil
Paper
Plugs for ports

PERSONNEL: One

PRELIMINARY PROCEDURES: Hydraulic motor assembled (para 20-43).

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in parts. Dirt can damage equipment.

Use lint-free cloths for oil spillage.

Put plugs in ports to keep out dirt.

NOTE

If normal indication is not obtained, hydraulic motor must be disassembled (para 20-42).

Test Conditions:

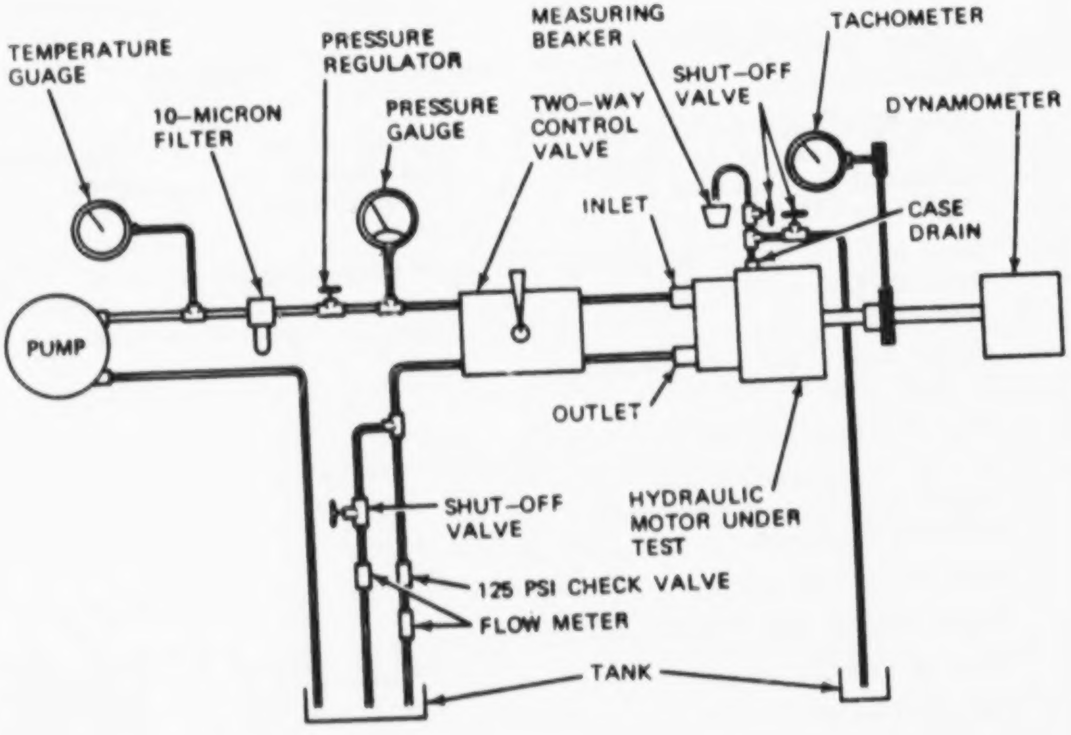
(a) Maintain hydraulic fluid at a temperature of 100° ±4°F, unless otherwise specified.
Maximum height of drain line is 1 to 4 inches above maximum height of drain case.
Maintain drain case full of hydraulic fluid.
Maintain 125 psi at discharge port unless otherwise specified.
Run-in tests on motor to be run in both directions.
All shut-off valves closed.

20-39. HYDRAULIC MOTOR TEST PROCEDURE (CONT)

a. Run-In Test A

FRAME 1

Step	Procedure	Normal Indication	Probable Fault
	SUPPORT SHOP WORK		
1.	Connect hydraulic motor to test setup.	. . .	. . .
2.	Open shut-off valve from case drain to tank.	. . .	. . .
3.	Put two-way control valve in position to allow flow to hydraulic motor inlet.	. . .	. . .
4.	Apply load of 36 to 40 inch-pound at hydraulic motor shaft with dynamometer.	. . .	. . .
5.	Slightly open pressure regulator.	. . .	. . .
6.	Turn on hydraulic pump.	. . .	. . .
7.	Adjust pressure regulator to operate hydraulic motor at 550 to 650 rpm in tachometer.	550 to 650 rpm on tachometer	. . .
8.	Using hands and watch, after five minutes turn off hydraulic pump.	Hydraulic motor should operate without excessive noise.	Bad hydraulic motor
9.	Put two-way control valve in opposite position and allow flow to hydraulic motor outlet.	. . .	. . .
10.	Repeat steps 6 thru 8.	. . .	. . .
	GO TO FRAME 2		

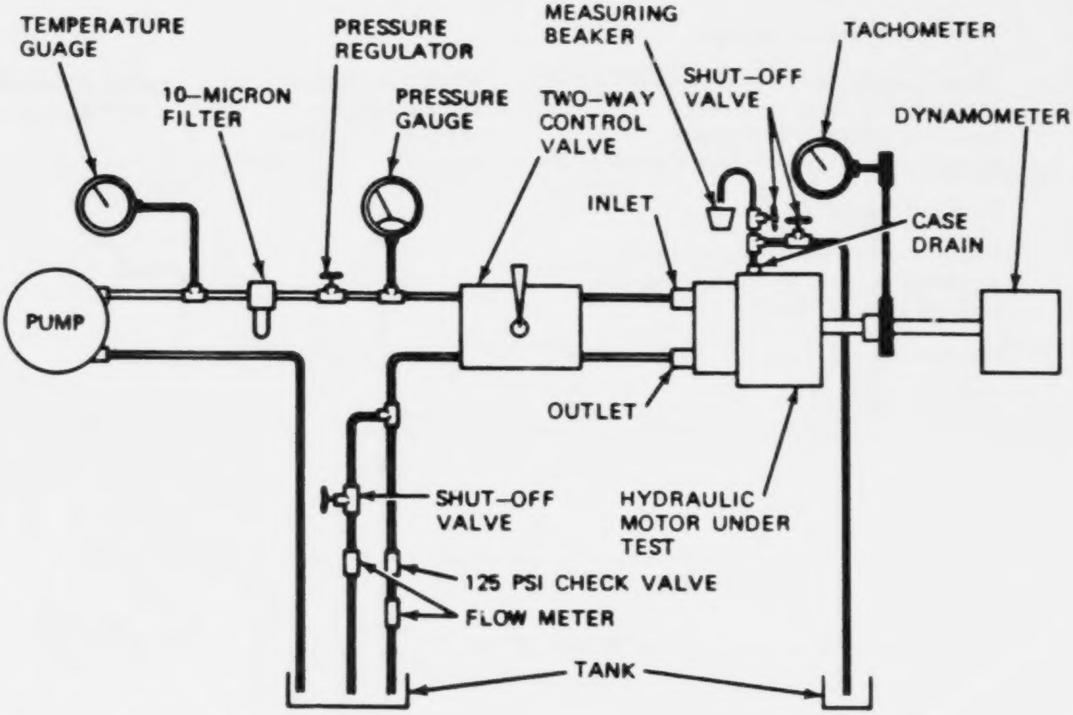

TEMPERATURE GUAGE
10-MICRON FILTER
PRESSURE REGULATOR
PRESSURE GAUGE
TWO-WAY CONTROL VALVE
MEASURING BEAKER
SHUT-OFF VALVE
TACHOMETER
DYNAMOMETER
INLET
CASE DRAIN
PUMP
OUTLET
SHUT-OFF VALVE
HYDRAULIC MOTOR UNDER TEST
125 PSI CHECK VALVE
FLOW METER
TANK

20-39. HYDRAULIC MOTOR TEST PROCEDURE (CONT)

b. Run-In Test B

FRAME 2

Step	Procedure	Normal Indication	Probable Fault
	SUPPORT SHOP WORK		
1.	Apply load of 0.025 to 0.029 pounds/second^2 at hydraulic motor shaft with dynamometer.	. . .	. . .
2.	Turn on hydraulic pump.	. . .	. . .
3.	Adjust pressure regulator to operate hydraulic motor at 4750 to 4850 rpm on tachometer.	. . .	. . .
4.	Using hands and watch, put two-way control valve in off position for one second and then back to original position.	Hydraulic motor should operate without excessive noise.	Bad hydraulic motor
5.	Allow hydraulic motor speed to return to 4750 to 4850 rpm on tachometer.	4750 to 4850 rpm on tachometer	. . .
6.	Repeat steps 4 and 5 for 24 times to shock motor.	. . .	. . .
7.	Turn off hydraulic pump.	. . .	. . .
8.	Put two-way control valve in opposite position and allow flow to hydraulic motor inlet.	. . .	. . .
9.	Turn on hydraulic pump.	. . .	. . .
10.	Repeat steps 4 thru 6.	. . .	. . .
11.	Turn off hydraulic pump.	. . .	. . .
	GO TO FRAME 3		


TEMPERATURE GUAGE
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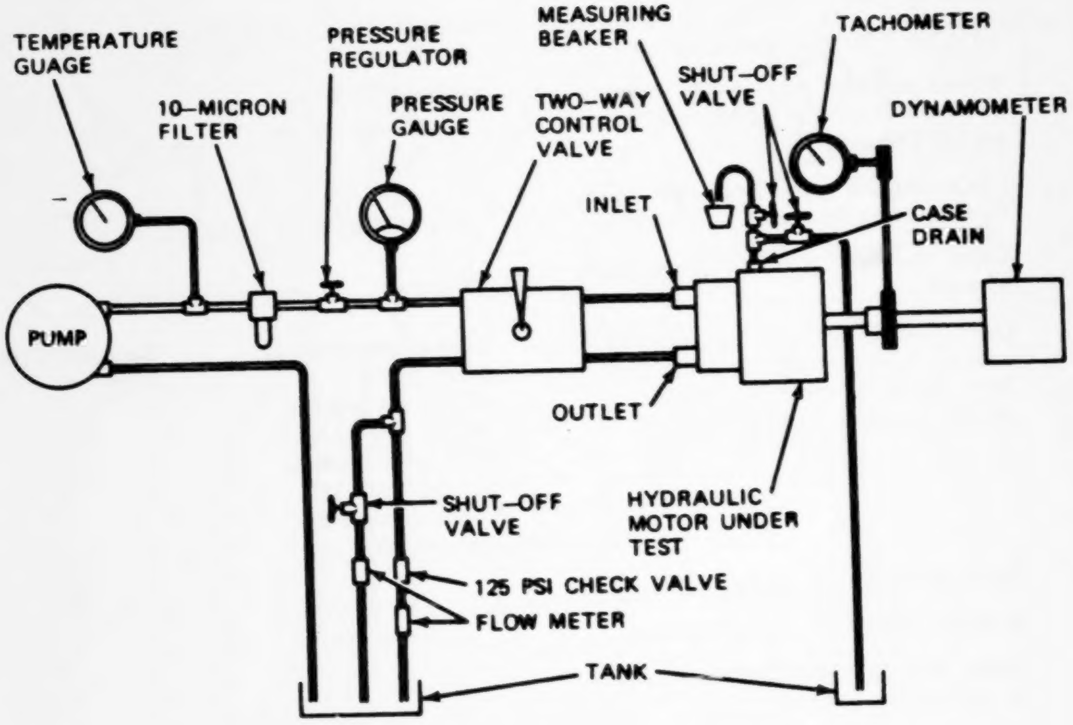
PRESSURE REGULATOR
PRESSURE GAUGE
TWO–WAY CONTROL VALVE
MEASURING BEAKER
SHUT–OFF VALVE
TACHOMETER
DYNAMOMETER
INLET
CASE DRAIN
PUMP
OUTLET
SHUT–OFF VALVE
HYDRAULIC MOTOR UNDER TEST
125 PSI CHECK VALVE
FLOW METER
TANK

20-39. HYDRAULIC MOTOR TEST PROCEDURE (CONT)

c. Run-In Test C

FRAME 3

Step	Procedure	Normal Indication	Probable Fault
	SUPPORT SHOP WORK		
1.	Apply load of 36 to 44 inch-pounds at hydraulic motor shaft with dynamometer.	. . .	. . .
2.	Turn on hydraulic pump.	. . .	. . .
3.	Using hands and watch, adjust pressure regulator to operate hydraulic motor at minimum temperature of 150°F for 1 minute.	Hydraulic motor should operate without excessive noise.	Bad hydraulic motor
4.	Turn off hydraulic pump.	. . .	. . .
5.	Put two-way control valve in opposite position and allow flow to hydraulic motor outlet.	. . .	. . .
6.	Repeat steps 2 thru 4.	. . .	. . .
	GO TO FRAME 4		


TEMPERATURE GUAGE
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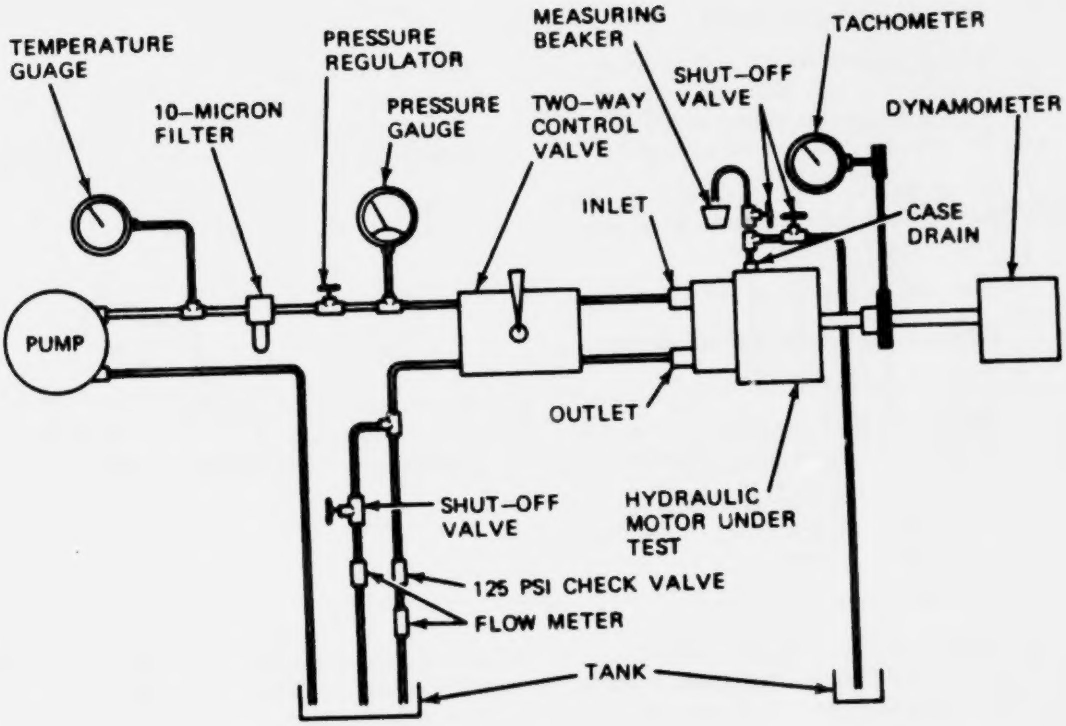
PRESSURE REGULATOR
PRESSURE GAUGE
TWO–WAY CONTROL VALVE
MEASURING BEAKER
SHUT–OFF VALVE
TACHOMETER
DYNAMOMETER
INLET
CASE DRAIN
PUMP
OUTLET
SHUT–OFF VALVE
HYDRAULIC MOTOR UNDER TEST
125 PSI CHECK VALVE
FLOW METER
TANK

20-39. HYDRAULIC MOTOR TEST PROCEDURE (CONT)

d. Relief Valve Setting Test

FRAME 4

Step	Procedure	Normal Indication	Probable Fault
	SUPPORT SHOP WORK		
1.	Apply load and lock hydraulic motor shaft with dynamometer.	. . .	. . .
2.	Put two-way control valve in opposite position and allow flow to hydraulic motor inlet.	. . .	. . .
3.	Turn on hydraulic pump.	. . .	. . .
4.	Adjust pressure regulator to operate hydraulic motor at 1800 to 2100 psi on pressure gauge.	1800 to 2100 psi on pressure gauge	. . .
5.	Open shut-off valve from case drain to measuring beaker.	. . .	. . .
6.	Close shut-off valve from case drain to tank.	. . .	. . .
7.	Open shut-off valve from two-way control valve to tank and get flow from 30 to 40 cubic inches per minute on flow meter.	External leakage at drain ports measuring beaker should not exceed 4.58 cubic inches per minute (75 cubic centimeters per minute).	Bad hydraulic motor
8.	Turn off hydraulic pump.	. . .	. . .
9.	Remove load from dynamometer.	. . .	. . .
10.	Close shut-off valve from case drain to measuring beaker.	. . .	. . .
11.	Open shut-off valve from case drain to tank.	. . .	. . .
	GO TO FRAME 5		


TEMPERATURE GUAGE
10-MICRON FILTER
PRESSURE REGULATOR
PRESSURE GAUGE
TWO-WAY CONTROL VALVE
MEASURING BEAKER
SHUT-OFF VALVE
TACHOMETER
DYNAMOMETER
INLET
CASE DRAIN
PUMP
OUTLET
HYDRAULIC MOTOR UNDER TEST
SHUT-OFF VALVE
125 PSI CHECK VALVE
FLOW METER
TANK

20-39. HYDRAULIC MOTOR TEST PROCEDURE (CONT)

e. Internal Leakage Test A and B

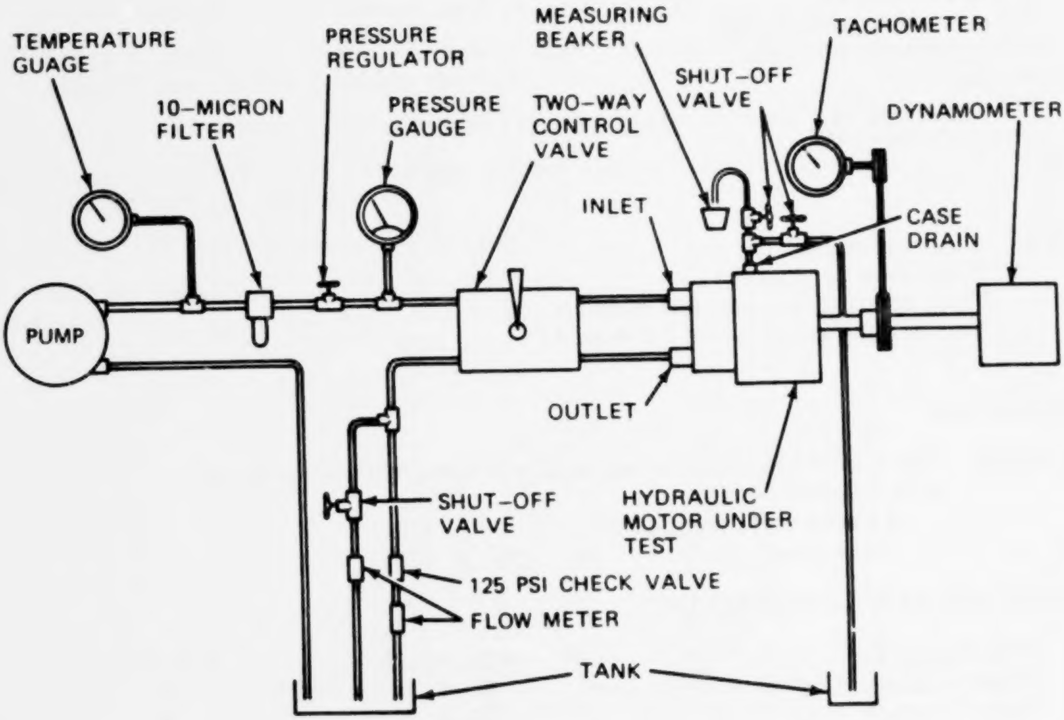
FRAME 5

Step	Procedure	Normal Indication	Probable Fault
	SUPPORT SHOP WORK		
1.	Open shut-off valve from two-way control valve to tank.	. . .	. . .
2.	Turn on hydraulic pump.	. . .	. . .
3.	Adjust dynamometer and pressure regulator to get 1000 to 1050 psi with a hydraulic motor speed of 594 to 606 rpm on tachometer.	1000 to 1050 psi on pressure gauge 594 to 606 rpm on tachometer	. . .
4.	Using pencil, paper and watch, record flow measurement from flow meter for 1 minute.	. . .	. . .
5.	Turn off hydraulic pump.	. . .	. . .
6.	Remove load from dynamometer.	. . .	. . .
7.	Turn on hydraulic pump.	. . .	. . .
8.	Adjust pressure regulator to get 594 to 606 rpm on tachometer.	594 to 606 rpm on tachometer	. . .
9.	Using pencil, paper and watch, record flow measurement from flow meter for 1 minute.	. . .	. . .
10.	Turn off hydraulic pump.	. . .	. . .
11.	Using pencil and paper, subtract flow measurement from step 9 from flow measurement from step 4.	Measurement should not exceed 15 cubic inches per minute.	Bad hydraulic motor
12.	Remove hydraulic motor from test setup.	. . .	. . .

NOTE

If normal indication was obtained, hydraulic motor is good.

END OF TASK


TEMPERATURE GUAGE
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PRESSURE REGULATOR
PRESSURE GAUGE
TWO-WAY CONTROL VALVE
MEASURING BEAKER
SHUT-OFF VALVE
TACHOMETER
DYNAMOMETER
INLET
CASE DRAIN
PUMP
OUTLET
SHUT-OFF VALVE
HYDRAULIC MOTOR UNDER TEST
125 PSI CHECK VALVE
FLOW METER
TANK

20-40. HYDRAULIC MOTOR REMOVAL PROCEDURE

TOOLS: 5/16" socket (3/8" drive)
1/4" drift pin
8 ounce ball peen hammer
3/16" hex head socket (3/8" drive)
3/4" combination wrench
1-1/8" combination wrench
9/16" combination wrench
1" combination wrench
6" extension (3/8" drive)
3/8" drive ratchet
3/8" drive hinged handle
13/16" combination wrench
O-ring extractor kit
11/16" combination wrench
7/8" combination wrench
Scraper
Stiff bristled brush
Vise with brass caps

SUPPLIES: 2 quart container
Rags (item 21, App. A)
Plugs and caps for tubes and adapters
Dry cleaning solvent (item 33, App. A)

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to lower hydraulic pressure
JPG for procedures to:
Remove preformed packings
Clean parts

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6
Turret Traversing Mechanism	FO-2	14

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY Switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

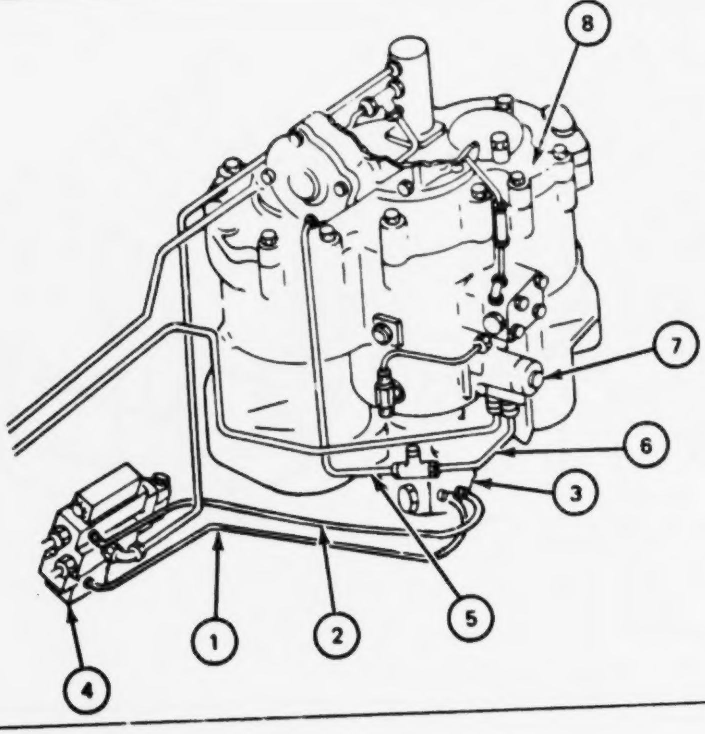
Keep dirt from getting in parts. Dirt can damage equipment. Use rags for oil spillage.

Put plugs in tubes and caps on adapters to keep out dirt.

20-40. HYDRAULIC MOTOR REMOVAL PROCEDURE (CONT)

FRAME 1

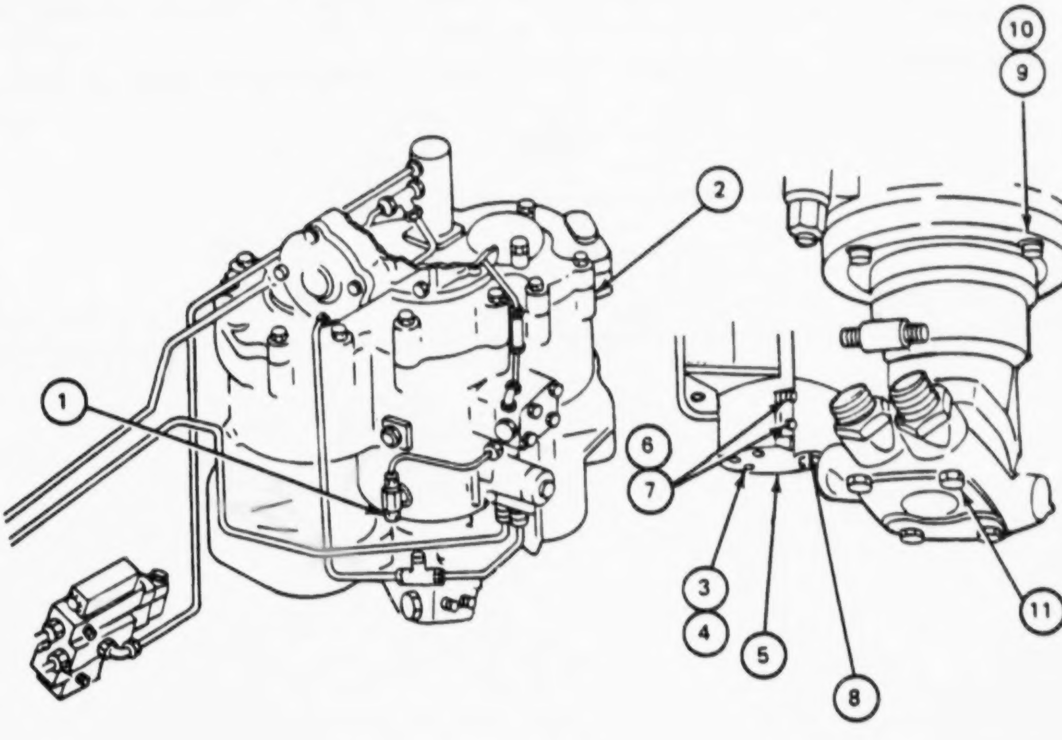
Step	Procedure
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
1.	Lower hydraulic system pressure to 0 psi (TM-20-2-3).
2.	Using 1" and 1-1/8" wrenches, remove tubes (1) and (2) between hydraulic motor (3) adapters and traverse stabilizer valve (4).
3.	Using 9/16" wrench, disconnect tube (5) from hydraulic motor (3) tee.
4.	Using 9/16" and 11/16" wrenches, remove tube (6) between hydraulic motor (3) tee and pin lock (7) adapter.
5.	Using 7/8" wrench, loosen oil fill plug (8).
	GO TO FRAME 2



20-40. HYDRAULIC MOTOR REMOVAL PROCEDURE (CONT)

FRAME 2

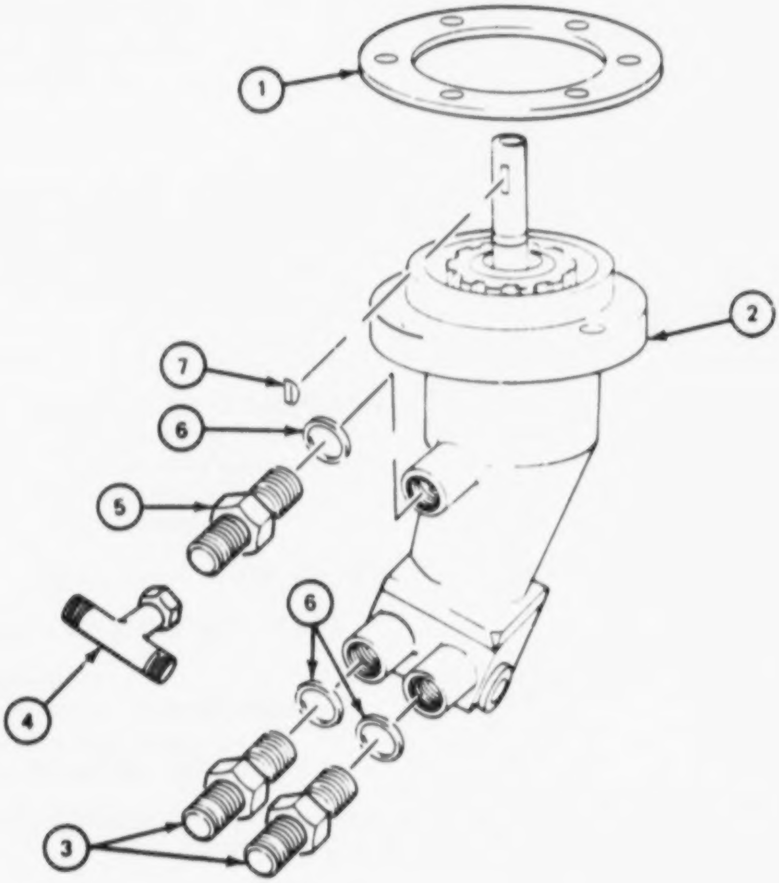
Step	Procedure
1.	Put container under drain plug (1).
2.	Using 3/4" wrench, remove drain plug (1) from traversing mechanism (2). Let oil drain.
3.	Using 3/4" wrench, replace drain plug (1) in traversing mechanism (2).
4.	Using 5/16" socket wrench with hinged handle, remove three screws (3) and three assembled washers (4) that attach plate (5) to traversing mechanism (2). Remove plate.
5.	Using 5/16" socket wrench with hinged handle, remove two screws (6) and two assembled washers (7) that attach left guard (8) to traversing mechanism (2). Remove guard.
6.	Using hands to support motor, use 3/16" hex head socket with extension to remove four screws (9) and four lockwashers (10) that attach motor (11) to traversing mechanism (2). Remove motor.
	GO TO FRAME 3



20-40. HYDRAULIC MOTOR REMOVAL PROCEDURE (CONT)

FRAME 3

Step	Procedure
	NOTE Gasket (1) may remain on traversing mechanism.
1.	Using hands, remove gasket (1) from hydraulic motor (2).
	NOTE Do steps 2 thru 6 if hydraulic motor (2) is to be replaced. It may be necessary to put hydraulic motor (2) in vise.
2.	Using 1-1/8" wrench, remove two adapters (3) from hydraulic motor (2).
3.	Using 9/16" and 13/16" wrenches, remove tee (4) from adapter (5).
4.	Using 13/16" wrench, remove adapter (5) from hydraulic motor (2).
5.	Using O-ring extractor tool, remove three preformed packings (6) from two adapters (3) and adapter (5) (JPG). Throw preformed packings (6) away.
6.	Using hammer and drift pin, remove woodruff key (7) from hydraulic motor (2) shaft.
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG).
	END OF TASK



20-41. HYDRAULIC MOTOR INSTALLATION PROCEDURE

TOOLS:
- 9/16" combination wrench
- 11/16" combination wrench
- 13/16" combination wrench
- 1" combination wrench
- 1-1/8" combination wrench
- Soft brass hammer
- 3/16" hex head socket (3/8" drive)
- 3/8" drive torque wrench (0 to 150 inch-pounds)
- 6" extension (3/8" drive)
- 5/16" socket (3/8" drive)
- 3/8" drive hinged handle
- O-ring extractor kit

SUPPLIES:
- Mounting gasket (7739311)
- Preformed packing (MS 28778-8) (two)
- Preformed packing (MS 28778-6)
- Hydraulic fluid (item 10, App. A)

PERSONNEL: One

REFERENCES: LO 9-2350-257-12 for procedures to:
- Fill traversing mechanism
- Fill power pack

JPG for procedures to:
- Use torque wrench
- Install preformed packings

TM 9-2350-257-10 for procedure to traverse turret

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6
Turret Traversing Mechanism	FO-2	14

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traverse lock set to LOCKED

PRELIMINARY PROCEDURES: Assemble hydraulic motor (para 20-43)
Test hydraulic motor (para 20-39)

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in tubing or parts. Dirt can damage equipment.

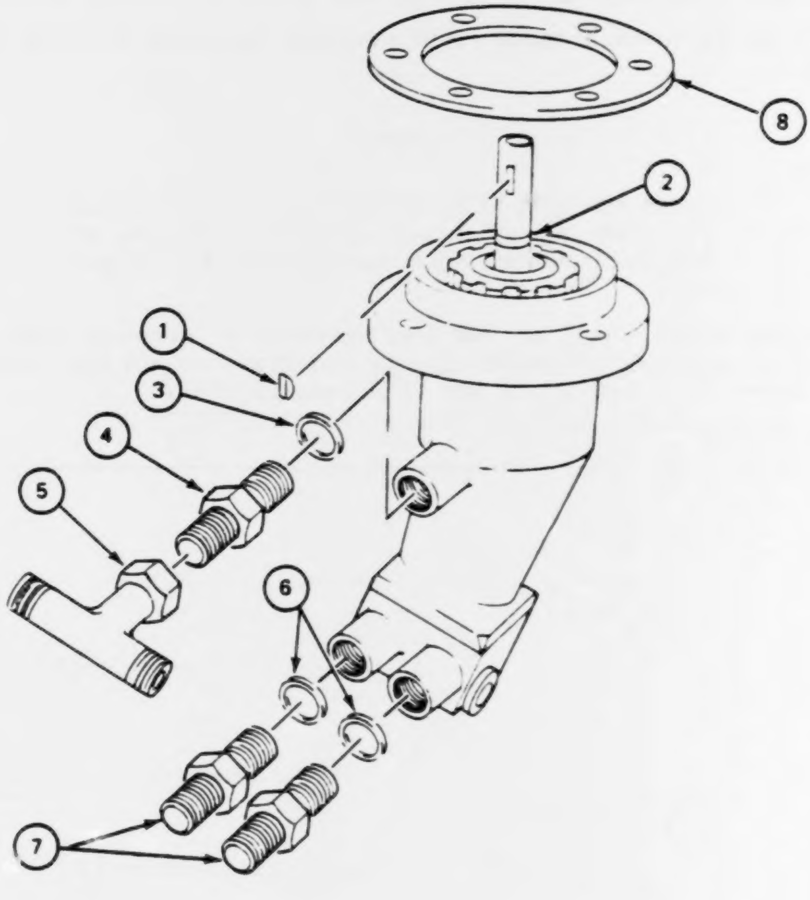
NOTE

Remove plugs from tubes and caps from adapters.

20-41. HYDRAULIC MOTOR INSTALLATION PROCEDURE (CONT)

FRAME 1

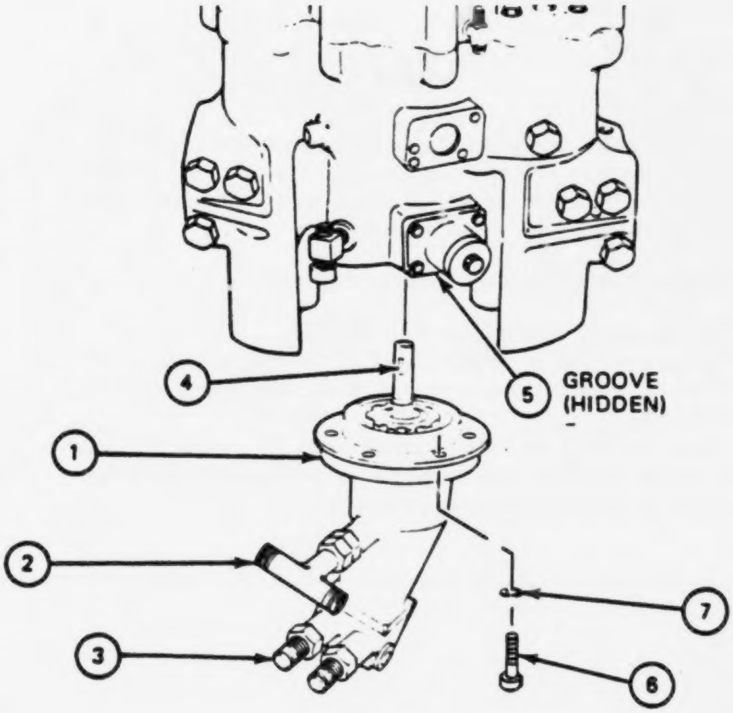
Step	Procedure
	NOTE Do steps 1 through 8 if hydraulic motor was replaced.
1.	Using hammer, put woodruff key (1) in shaft of hydraulic motor (2).
2.	Woodruff key should be flat with edge of shaft.
3.	Using hands, lightly coat packing (3) with hydraulic fluid. Using O-ring extractor tool, put preformed packing (3) on adapter (4) (JPG).
4.	Using 13/16" wrench, put adapter (4) in port of hydraulic motor (2).
5.	Using 9/16" and 11/16" wrenches, put tee (5) on adapter (4).
6.	Using hands, lightly coat two packings (6) with hydraulic fluid.
7.	Using O-ring extractor tool, put two preformed packings (6) on two adapters (7) (JPG).
8.	Using 1" wrench, put two adapters (7) in ports of hydraulic motor (2).
9.	Using hands, put gasket (8) on hydraulic motor (2).
	GO TO FRAME 2



20-41. HYDRAULIC MOTOR INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using hands, position hydraulic motor (1) so adapters (2) and (3) face hydraulic lines.
2.	Using hands, rotate shaft key (4) to align with groove in traversing mechanism (5).
3.	Using hands, put hydraulic motor (1) in traversing mechanism (5). Hold hydraulic motor in place. **NOTE** Turret may have to be traversed and hydraulic motor (1) turned slightly to gain access to screw holes of hydraulic motor between traversing mechanism (5) gear teeth.
4.	Using torque wrench with 3/16" hex head socket and 6" extension, attach hydraulic motor (1) to traversing mechanism (5) with four screws (6) and four lockwashers (7). Torque screws (6) to between 32 and 40 inch-pounds (JPG). GO TO FRAME 3


GROOVE
(HIDDEN)

20-41. HYDRAULIC MOTOR INSTALLATION PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using 5/16" socket wrench and hinge handle, attach guard (1) to traversing mechanism (2) with two screws (3) and two assembled washers (4).
2.	Using 5/16" socket wrench and hinge handle, attach plate (5) to traversing mechanism (2) with three screws (6) and three assembled washers (7).
3.	Using 9/16" and 11/16" wrenches, connect tube (8) to tee (9) and pinlock (10).
4.	Using 9/16" combination wrench, connect tube (11) to tee (9).
5.	Using 1" and 1-1/8" wrenches, connect two tubes (12) to hydraulic motor (13) and traverse stabilizer valve (14).

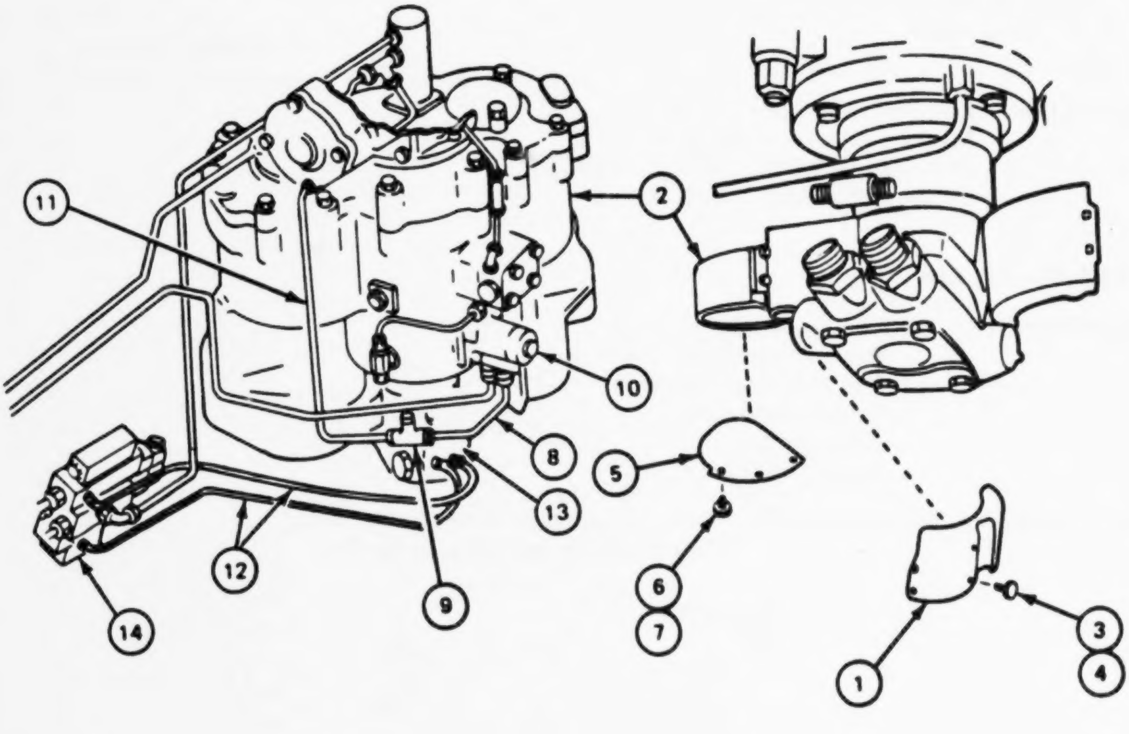
NOTE

Do the following tasks if this procedure completes the maintenance of the hydraulic system. If other maintenance must be done, make sure following tasks are completed after other maintenance.

Follow-on Maintenance Action Required:

Fill traversing mechanism with oil (LO).
Fill power pack to proper level (LO).
Traverse turret three turns to bleed air from system (TM-10).
Check for leaks and repair as required.
Traverse turret in power mode to make sure hydraulic motor is working properly (TM-10).

END OF TASK



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE

TOOLS: Needle nose pliers
1/2" combination wrench
1" combination wrench
1/4" drift pin
1/2" drift pin
5/32" socket head screw key (Allen wrench)
20 ounce ball peen hammer
External retaining ring pliers
1/4" flat tip screwdriver
Vise with brass caps
O-ring extractor kit
Diagonal cutting pliers
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Lint-free cloth (item 21, App. A)
Masking tape (item 36, App. A)
Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

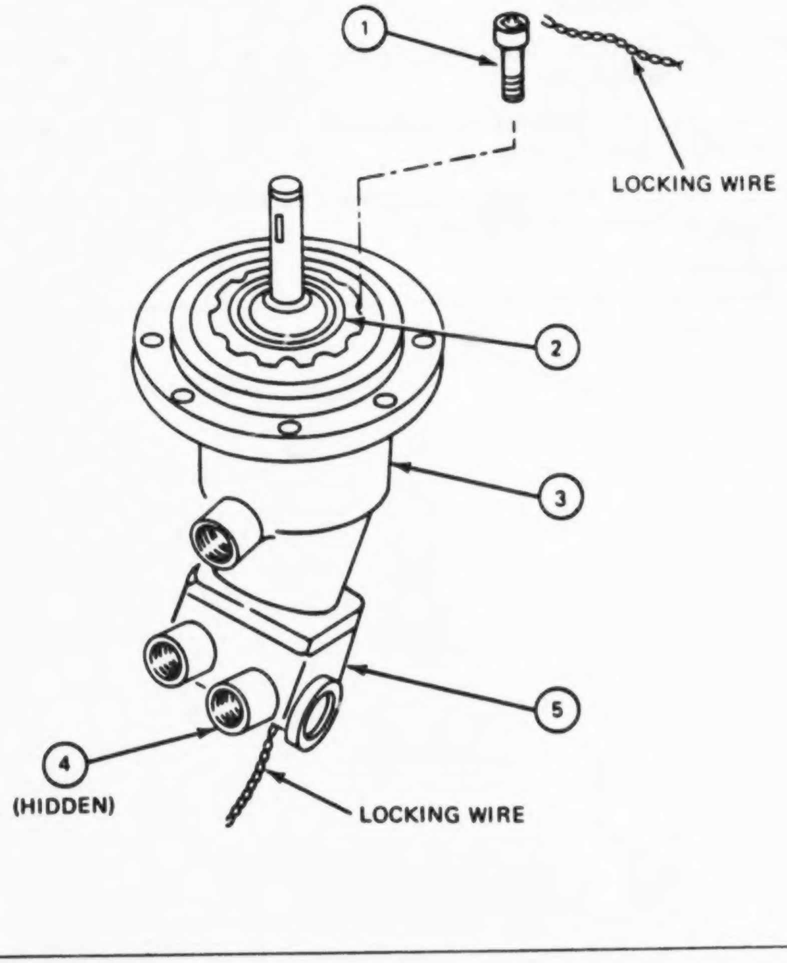
REFERENCES: JPG for procedures to:
Remove preformed packing
Use retaining ring pliers
Remove lockwire
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Remove hydraulic motor (para 20-40)
Test hydraulic motor (para 20-39)

20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 1

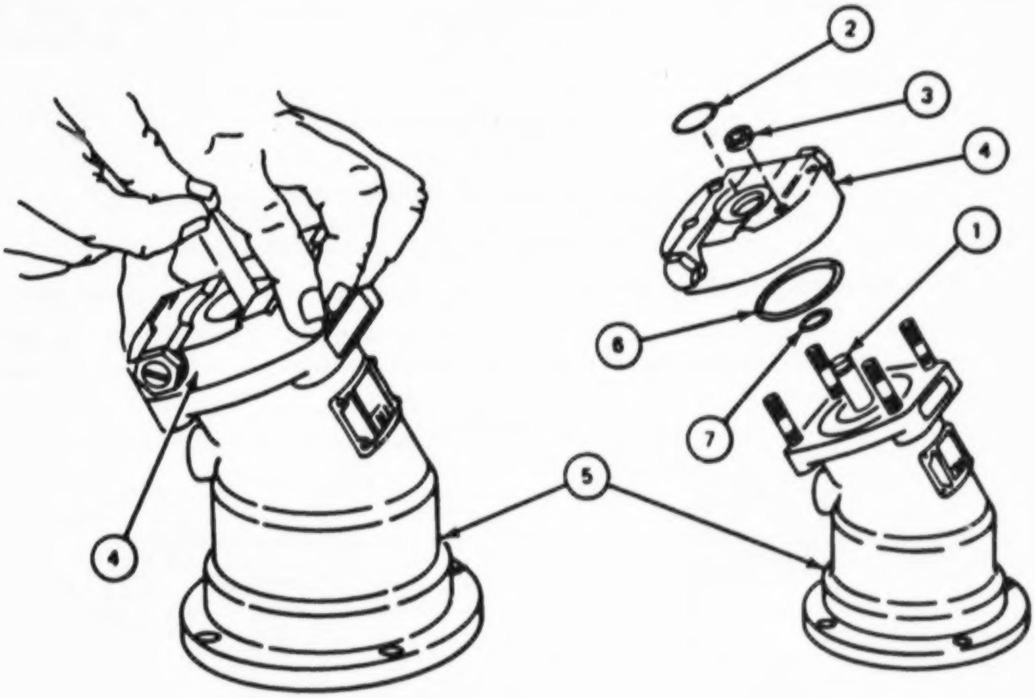
Step	Procedure
1.	Using diagonal cutting pliers, cut lockwire from twelve screws (1) in bearing retainer (2) of housing (3) (JPG).
2.	Using needle nose pliers, remove lockwire from twelve screws (1) (JPG).
3.	Using needle nose pliers, remove lockwire from four nuts (4) on relief valve (5) of housing (3) (JPG).
4.	Using Allen wrench, remove twelve screws (1) that attach bearing retainer (2) to housing (3).
	GO TO FRAME 2



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 2

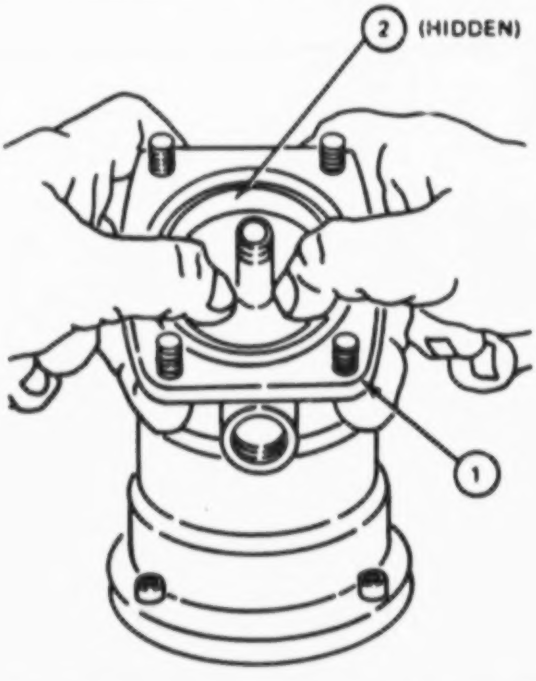
Step	Procedure
1.	Using flat tip screwdriver, slightly raise end of cylinder bearing pin (1) and hold to allow access to "C" washer (2).
2.	Using flat tip screwdriver remove "C" washer (2) from cylinder bearing pin (1). Release cylinder bearing pin.
3.	Using 1/2" wrench, remove four locknuts (3) that attach valve plate (4) to housing (5).
	CAUTION To prevent damage to hydraulic motor pistons, cylinder bearing pin (1) must be held down during valve plate (4) removal.
4.	Using 1/4" drift pin, hold down on cylinder bearing pin (1) and remove valve plate (4). Release cylinder bearing pin.
5.	Using O-ring extractor tool, remove preformed packing (6) from housing (5) (JPG). Throw preformed packing away.
6.	Using O-ring extractor tool, remove preformed packing (7) from cylinder bearing pin (1) (JPG). Throw preformed packing away.
	GO TO FRAME 3

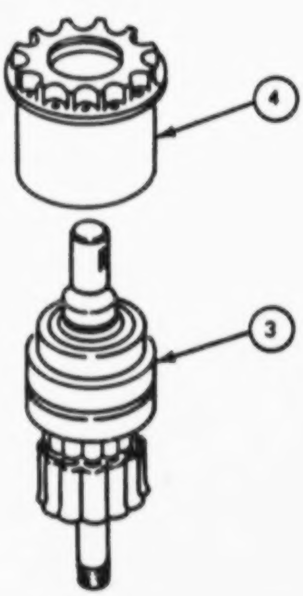


20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 3

Step	Procedure
	CAUTION During housing (1) removal, guide rotating group (3) along angle of housing, being careful not to cock parts.
1.	Using hands, grasp housing (1) with fingers and press against cylinder block (2) with thumbs, while lifting housing (1) from rotating group (3) and bearing and shaft seal retainer (4).
	CAUTION During rotating group (3) removal, use care to prevent parts from separating. Do not let bearings become cocked in bearing and shaft retainer (4).
2.	Using hands, remove rotating group (3) from bearing and shaft seal retainer (4). GO TO FRAME 4

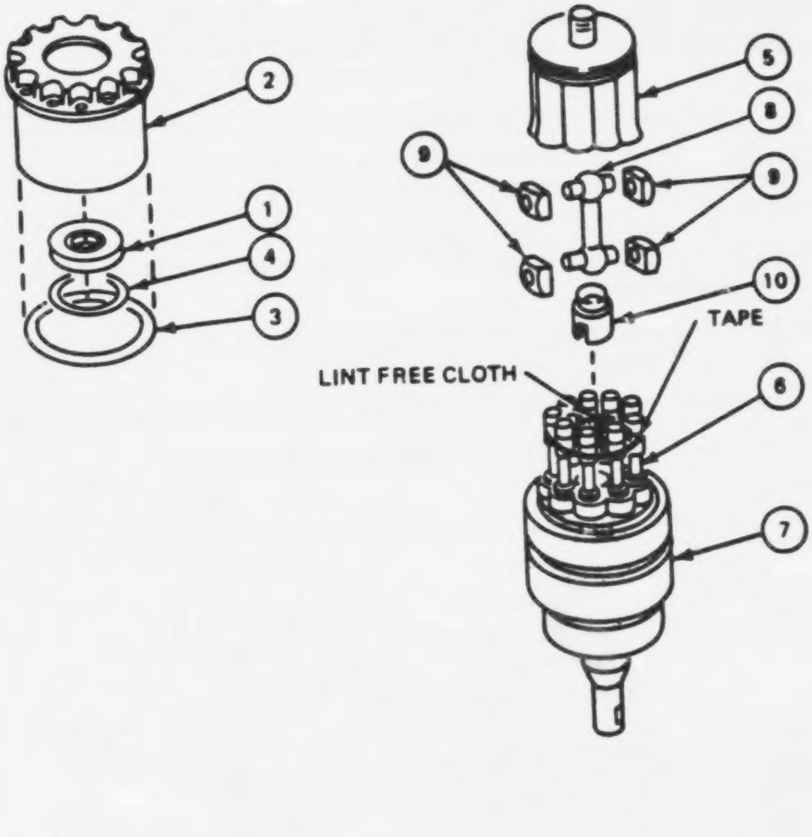




20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 4

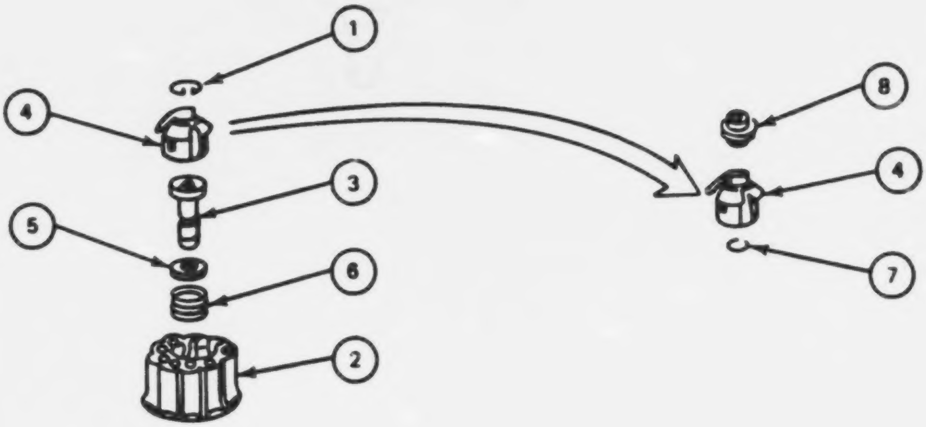
Step	Procedure
1.	Using 1/2" drift pin, lightly tap out shaft seal (1) from retainer (2).
2.	Using O-ring extractor tool, remove preformed packing (3) from groove on outside diameter of retainer (2) (JPG). Throw preformed packing away.
3.	Using hands, remove shaft seal ring (4).
	CAUTION During removal of cylinder block (5), do not allow pistons (6) to hit one another and cause damage.
4.	Using hands, remove cylinder block (5) from pistons (6) and shaft (7).
5.	Using hands, remove universal link (8) from shaft (7).
6.	Using hands, remove four knuckles (9) from universal link (8).
7.	Using hands, remove flexible bearing (10) from inside shaft (7).
8.	Using hands, place lint-free cloth in center of pistons (6) and wrap pistons (6) with tape to prevent pistons from hitting each other.
	GO TO FRAME 5


TAPE
LINT FREE CLOTH

20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 5

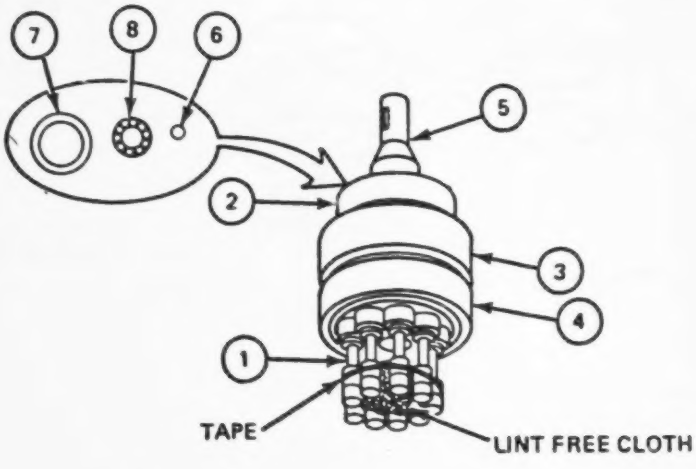
Step	Procedure
	WARNING Remaining parts are under spring tension and could hurt you. Place finger over top of cylinder block (2) to hold back parts. **NOTE** Retaining ring (1) tips can be seen only prior to being taken off.
1.	Using flat tip screwdriver, take out retaining ring (1) from inside cylinder block (2) by pushing tips toward each other.
2.	Using hands, push in on cylinder pin (3) and remove cylinder pin, bearing retainer (4), spring retainer (5), and spring (6) from cylinder block (2).
3.	Using retaining ring pliers, remove retaining ring (7) from fixed bearing (8) (JPG).
4.	Using hands, remove fixed bearing (8) from bearing retainer (4).
	GO TO FRAME 6



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 6

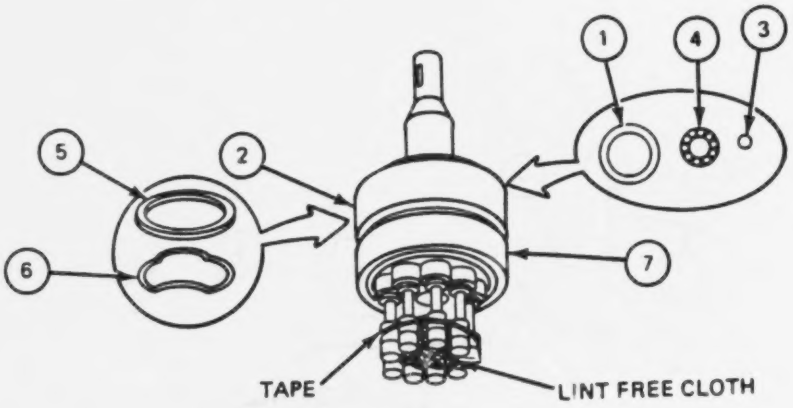
Step	Procedure
	SUPPORT SHOP WORK
1.	Take shaft with pistons (1) to shop where bearing puller is available.
	NOTE Bearings (2), (3), and (4) must be separated for removal from shaft (5). Balls (6) will fall out when bearings are separated.
2.	Using bearing puller, remove outer race (7) from bearing (2).
3.	Remove balls (6) and retainer (8). Mark bearings with tape as removed.
	GO TO FRAME 7



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 7

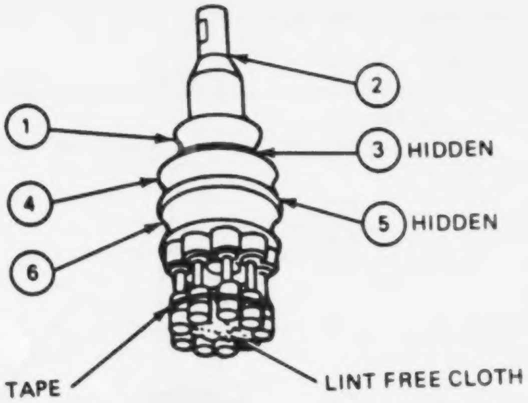
Step	Procedure
	SUPPORT SHOP WORK
1.	Using bearing puller, remove outer race (1) from bearing (2).
2.	Remove balls (3) and retainer (4).
3.	Remove bearing spacer (5) and wave washer (6).
4.	Do steps 1 and 2 for bearing (7) removal.
	GO TO FRAME 8



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 8

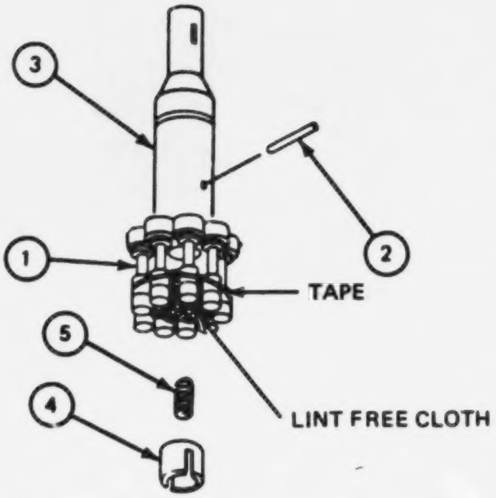
Step	Procedure
	SUPPORT SHOP WORK
1.	Using bearing puller, remove inner race (1) from shaft (2).
2.	Remove spacer (3) from shaft (2).
3.	Repeat steps 1 and 2 for inner race (4) and spacer (5).
4.	Repeat step 1 for inner race (6).
5.	After support shop work, return all parts to turret shop. GO TO FRAME 9


2
1
3 HIDDEN
4
5 HIDDEN
6
TAPE
LINT FREE CLOTH

20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 9

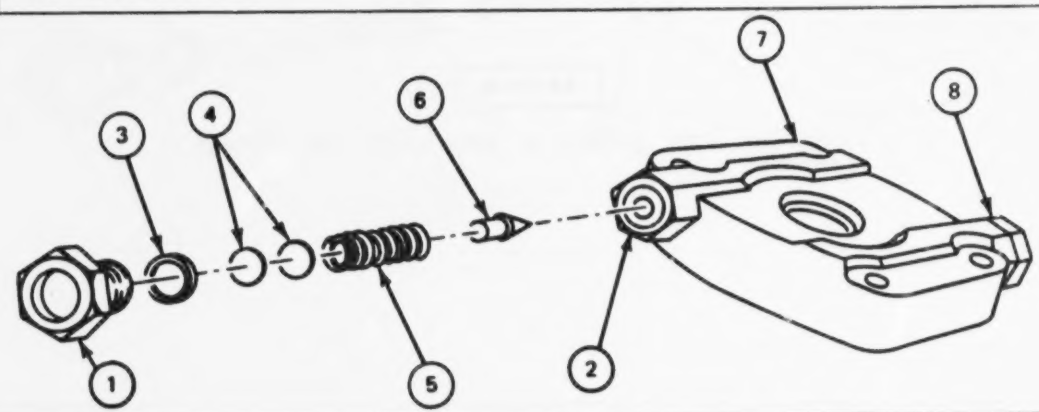
Step	Procedure
1.	Using hands, remove tape and lint-free cloth from pistons (1). **WARNING** Remaining parts are under spring tension and can hurt you. **CAUTION** Use care to avoid damage to pistons (1) during removal.
2.	Using 1/4" drift pin and hammer, tap out pin (2) from shaft (3).
3.	Using hands, remove flexible bearing retainer (4) and spring (5).
4.	Using hands, place lint-free cloth in center of pistons (1) and wrap pistons (1) with tape to prevent pistons from hitting each other. GO TO FRAME 10



20-42. HYDRAULIC MOTOR DISASSEMBLY PROCEDURE (CONT)

FRAME 10

Step	Procedure
	NOTE Do not mix parts from valve ports (2) and (8). Mark ports and tag parts during removal. It may be necessary to put plate (7) in vise to remove two plugs (1).
1.	Using 1" wrench, remove plug (1) from valve port (2).
2.	Using O-ring extractor tool, remove preformed packing (3) from plug (1) (JPG). Throw preformed packing away.
	NOTE Number of spacers (4) will vary.
3.	Using hands, remove spacers (4), spring (5), and valve piston (6) from valve port (2) of plate (7).
4.	Repeat steps 1 through 3 for valve port (8) of plate (7).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-38).
	END OF TASK



20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE

TOOLS: O-ring extractor kit
1/2" combination wrench
1" combination wrench
1/2" socket (3/8" drive)
13/16" socket (1/2" drive)
3/8" drive ratchet
5/32" hex head socket (3/8" drive)
3/8" drive torque wrench (0 to 600 inch-pounds)
1/4" drift pin
8 ounce ball peen hammer
External retaining ring pliers
1/4" flat tip screwdriver
Tweezers
Needle nose pliers
Vise with brass caps

SUPPLIES: Hydraulic fluid (item 10, App. A)
Dry cleaning solvent (item 33, App. A)
Masking tape (item 36, App. A)
Screw 1/4" x 20 NC (1" long)
Lint-free cloth (item 21, App. A)
Preformed packing (two)
Lockwire

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use torque wrench
Install lockwire
Use retaining ring pliers
Install preformed packings

PRELIMINARY PROCEDURES: Inspect hydraulic motor (para 20-38).

GENERAL INSTRUCTIONS:

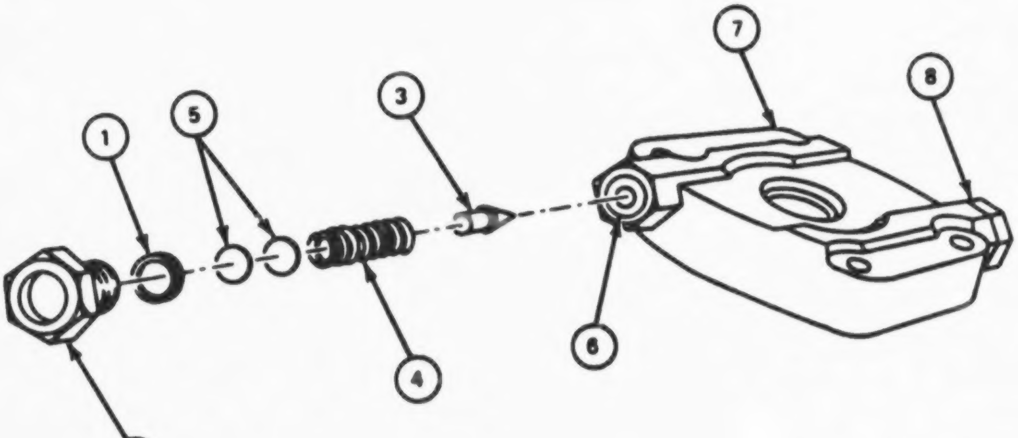
CAUTION

Keep dirt from getting in parts. Dirt can damage equipment.

20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 1

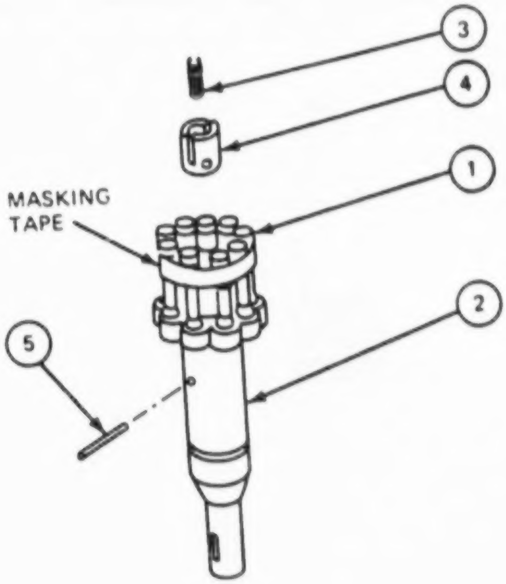
Step	Procedure
1.	Using hands, coat preformed packing (1) with hydraulic fluid.
2.	Using O-ring extractor tool, put preformed packing (1) on plug (2) (JPG).
	NOTE Number of spacers (5) may vary.
3.	Using hands, put valve piston (3), spring (4) and spacers (5) in port (6) of valve plate (7).
	NOTE It may be necessary to put valve plate (7) in vise.
4.	Using 1" wrench, put plug (2) in port (6) of valve plate (7).
5.	Repeat steps 1 through 4 for valve port (8).
	GO TO FRAME 2



20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 2

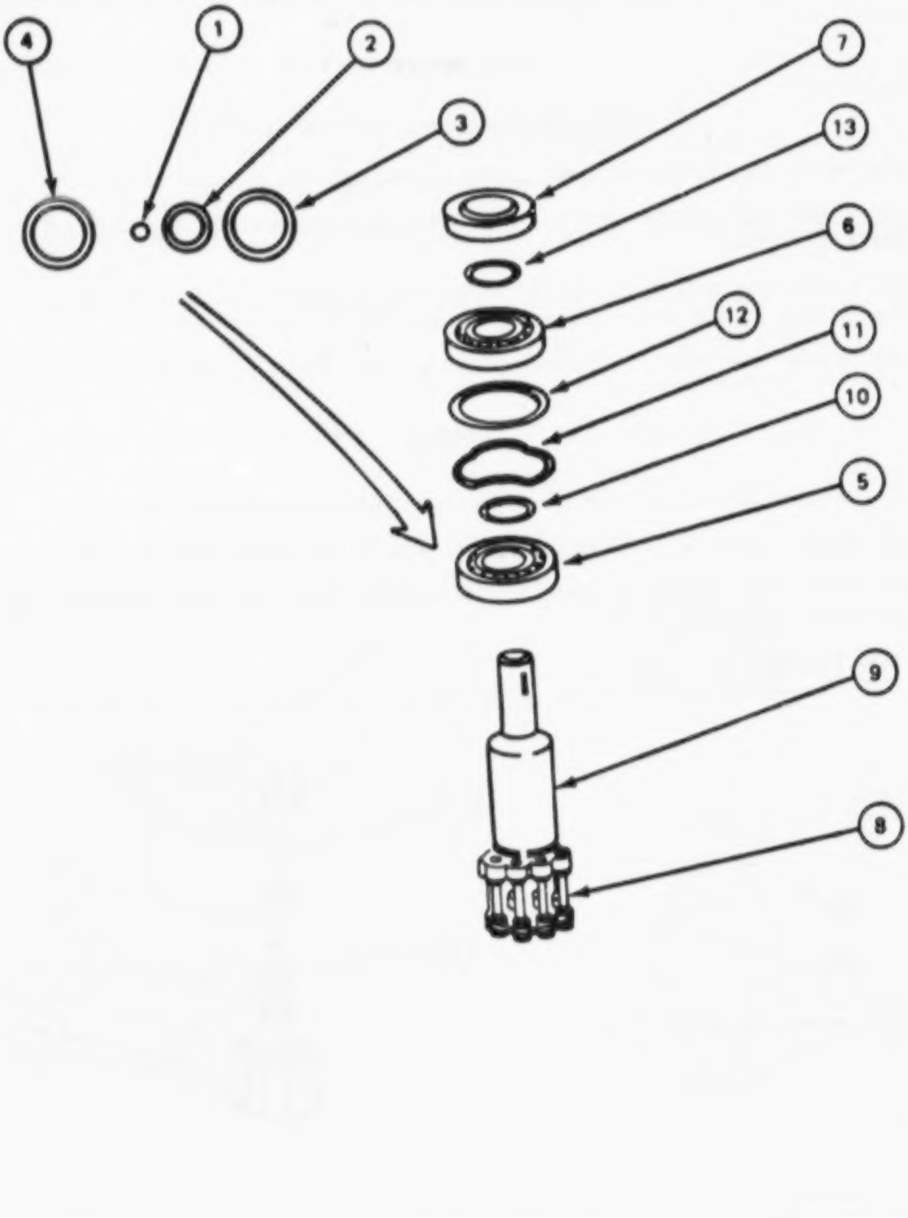
Step	Procedure
	NOTE Do step 1 only if pistons (1) and shaft (2) were replaced.
1.	Using hands, place lint-free cloth in center of pistons (1) on shaft (2) and wrap pistons with tape to prevent pistons from hitting each other.
2.	Remove lint-free cloth from pistons (1).
3.	Using hands, put spring (3) and retainer (4) in shaft (2). Align hole in retainer (4) with hole in shaft (2).
4.	Using drift pin, compress spring (3) and put pin (5) in hole of shaft (2) to hold spring (3) and retainer (4) in place.
5.	Using hammer, tap pin (5) in shaft (2) until pin is flush with shaft surface.
6.	Put lint-free cloth in center of pistons (1).
	GO TO FRAME 3



20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 3

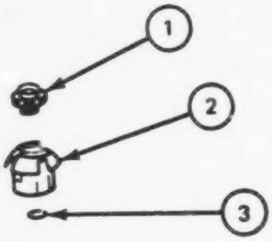
Step	Procedure
	SUPPORT SHOP WORK
1.	Take parts to shop where bearing press is available.
2.	Place balls (1) in retainer (2) and assemble inner race (3) and outer race (4) for bearing (5).
3.	Repeat step 1 for bearings (6) and (7).
4.	Put 13/16" socket in between pistons (8) to bridge hole in shaft (9).
5.	Using bearing press, put bearing (5) with writing up on shaft (9). Pull bearing (5) to end of shaft (9).
6.	Put spacer (10), wave washer (11) and bearing spacer (12) on shaft (9).
7.	Using bearing press, put bearing (6) on shaft (9) until flush with spacer (10).
8.	Put spacer (13) on shaft (9).
9.	Using bearing press, put bearing (7) on shaft (9) until flush with spacer (13).
10.	After support shop work, return parts to turret shop.
	GO TO FRAME 4

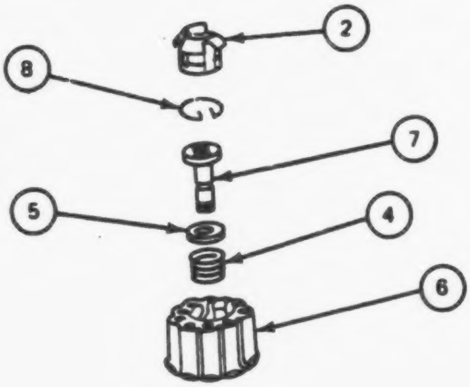


20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 4

Step	Procedure
1.	Using hands, put fixed bearing (1) in bearing retainer (2).
2.	Using retaining ring pliers, put retaining ring (3) in fixed bearing (1) (JPG).
	NOTE Position spring retainer with flat surface up.
3.	Using hands, put spring (4) and spring retainer (5) in cylinder block (6).
4.	Using hands, put cylinder pin (7) through spring retainer (5) and spring (4), into cylinder block (6).
5.	Using hands, put retaining ring (8) in groove of bearing retainer (2) with tips of retaining ring on flat side of bearing retainer facing up.
6.	Using needle nose pliers, compress retaining ring (8) tight around bearing retainer (2).
	NOTE Bearing retainer (2) must align with cylinder block (6).
7.	Using hands, align cut in bearing retainer with wide tips of cylinder block (6).
8.	Using hands, put bearing retainer (2) in cylinder block (6) until retaining ring (8) snaps in place and is seated.
	GO TO FRAME 5

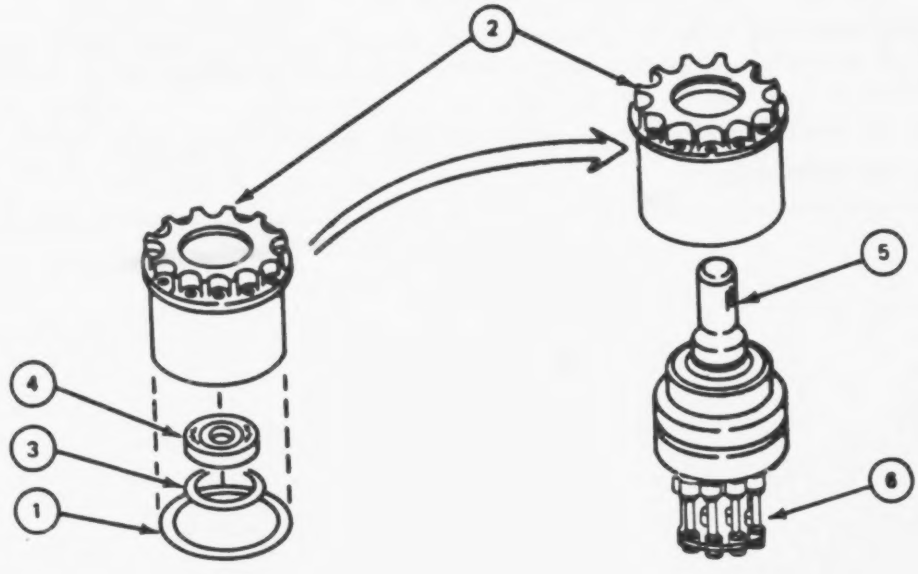




20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 5

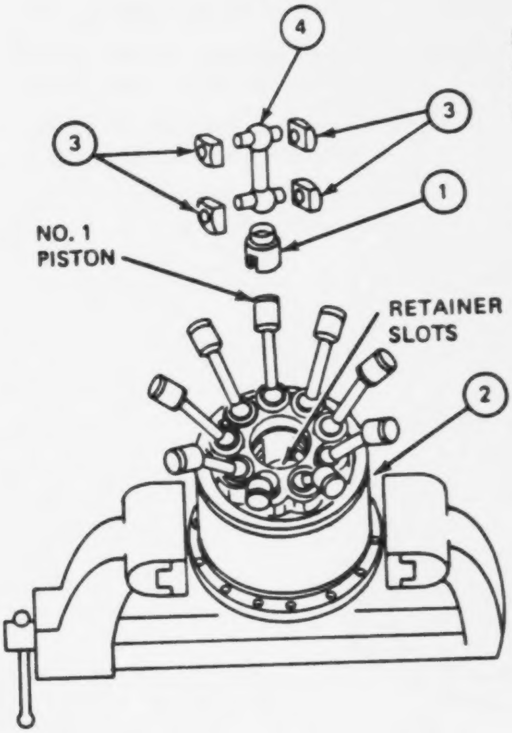
Step	Procedure
1.	Lightly coat preformed packing (1) with hydraulic fluid.
2.	Using O-ring extractor tool, put preformed packing (1) in groove on outside of retainer (2) (JPG).
3.	Lightly coat shaft seal ring (3) with hydraulic fluid.
4.	Using hands, put shaft seal ring (3) in groove around shaft seal (4).
5.	Using hands, put shaft seal (4) inside retainer (2) with lettered side up.
6.	Using hands, put retainer (2) on shaft (5).
7.	Using hands, remove lint-free cloth and tape from pistons (6) and clean pistons in dry cleaning solvent.
8.	Using hands, put shaft end (5) in vise.
	GO TO FRAME 6

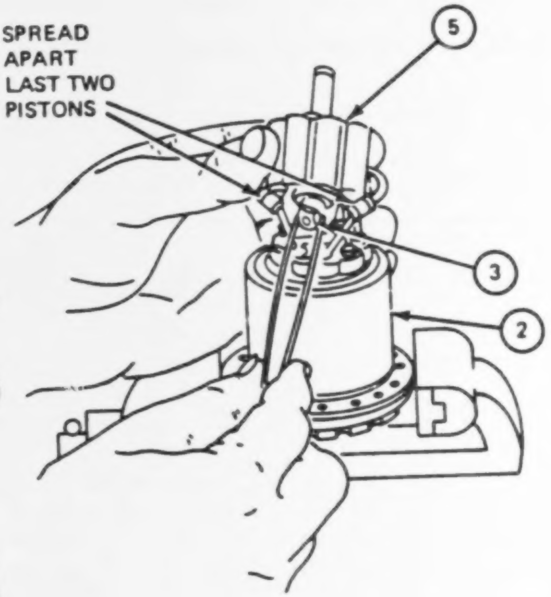


20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 6

Step	Procedure
1.	Using hands, put flexible bearing (1) in retainer (2).
2.	Using hands, put four knuckles (3) on universal link (4).
3.	Using hands, put universal link (4) in retainer (2) by holding universal link at slight angle and engaging one knuckle (3) in retainer slot. Engage the other knuckle in opposite slot.
4.	Lightly coat walls of cylinder block (5) and pistons with hydraulic fluid. **NOTE** Number one piston on retainer (2) is one directly in line with both slots for universal link. Number one bore in cylinder block (5) is one directly in line with both slots for universal link.
5.	Using hands and tweezers, hold cylinder block (5) over retainer (2) and put piston number one into cylinder block bore number one.
6.	Put pistons in bores by working to right and left side of number one piston until only two pistons remain outside of cylinder block (5).
7.	Using hands and tweezers, spread last two pistons apart and while holding cylinder block (5) at an angle, engage two upper knuckles (3) of universal link (4) in slots of cylinder block (5).
8.	Put two remaining pistons in cylinder block (5) bores. GO TO FRAME 7

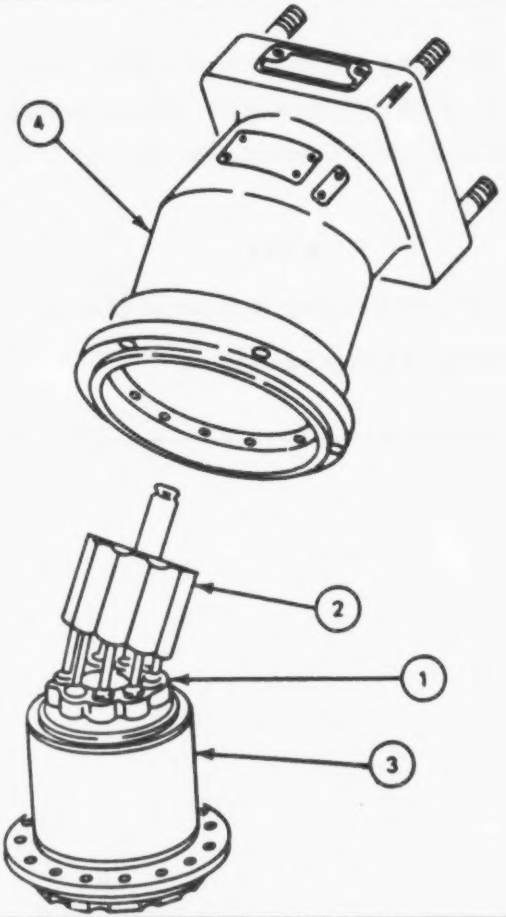

NO. 1 PISTON
RETAINER SLOTS


SPREAD APART LAST TWO PISTONS

20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 7

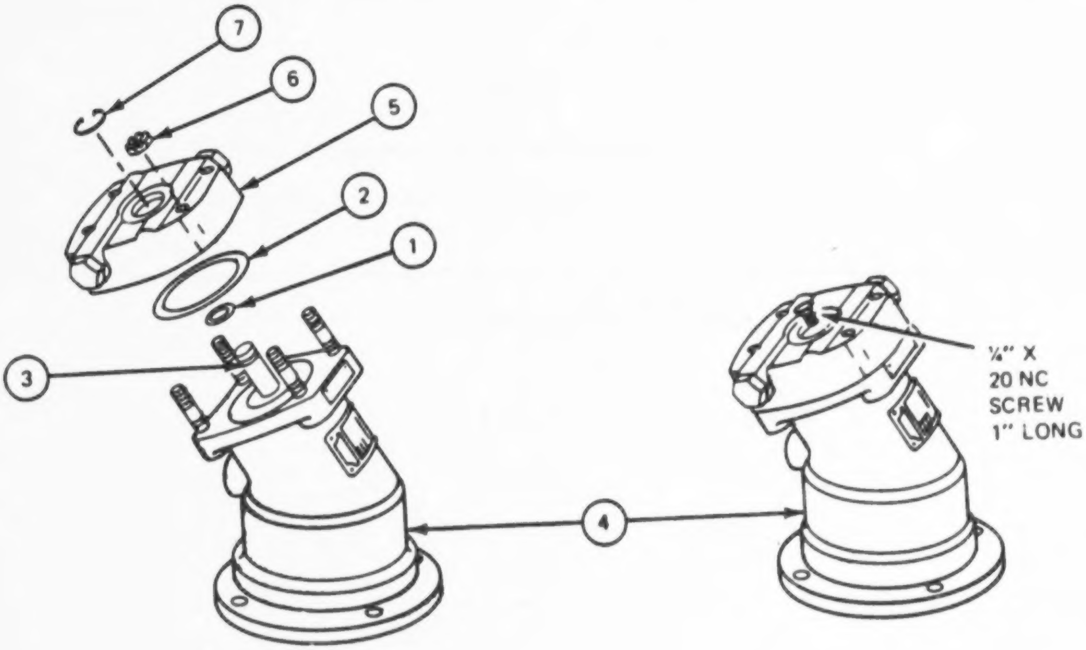
Step	Procedure
1.	Using hands, check assembled group (1) for freedom of motion by pushing cylinder block (2) down and allowing it to return. Motion should be smooth and springy.
2.	Using hands, check assembled group (1) for freedom of motion by turning cylinder block (2) while holding retainer (3). Motion should be smooth without binding at any point.
3.	If assembled group (1) motion is bad, disassemble to determine bad part (para 20-46).
4.	Using hands, carefully lower housing (4) over cylinder block (2) while guiding cylinder block along angle of housing.
5.	When housing (4) reaches retainer (3), make sure it is squarely over retainer to avoid cocking parts inside housing. GO TO FRAME 8



20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 8

Step	Procedure
1.	Lightly coat two preformed packings (1) and (2) with hydraulic fluid.
2.	Using O-ring extractor tool, put preformed packing (1) in groove of cylinder bearing pin (3) (JPG).
3.	Using O-ring extractor tool, put preformed packing (2) in groove on face of housing (4) (JPG).
4.	Using hands, put valve plate (5) on studs of housing (4).
5.	Using 1/2" combination wrench, attach valve plate (5) to housing (4) with four nuts (6). Do not tighten nuts.
6.	Using hands, put 1/4" x 20 NC screw in cylinder bearing pin (3).
7.	Using screwdriver, pry under screw head slightly until recess in cylinder bearing pin (3) is showing.
8.	Using screwdriver, put "C" clamp (7) in recess of cylinder bearing pin (3).
9.	Using hands, remove 1/4" x 20 NC screw from cylinder bearing pin (3).
10.	Using torque wrench and 1/2" socket, torque four nuts (6) to between 216 and 240 inch-pounds (JPG). **NOTE** Do not let bearings slide out of housing.
11.	Using hands, remove housing (4) from vise. GO TO FRAME 9


¼" X
20 NC
SCREW
1" LONG

20-43. HYDRAULIC MOTOR ASSEMBLY PROCEDURE (CONT)

FRAME 9

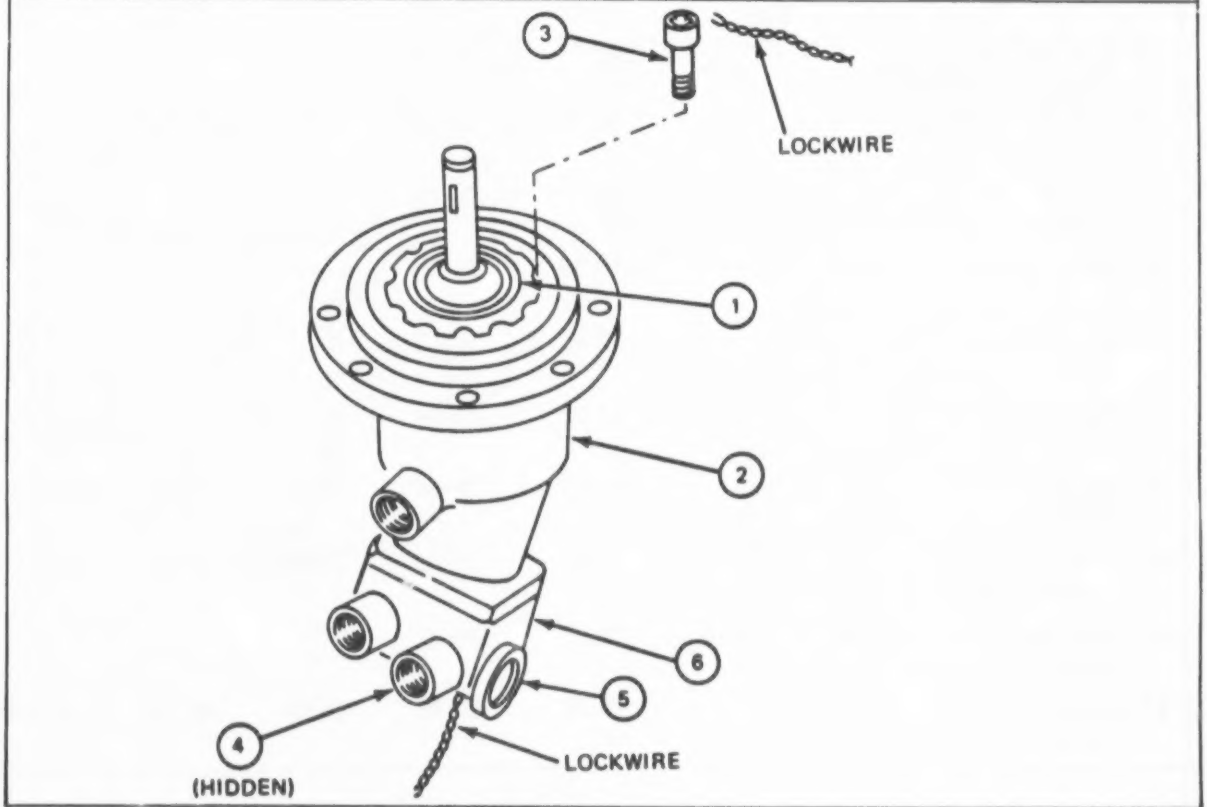
Step	Procedure
1.	Using 5/32'' hex head socket wrench, attach bearing retainer (1) to housing (2) with twelve screws (3).
2.	Using torque wrench with 5/32'' hex head socket, torque twelve screws (3) to between 35 and 45 inch-pounds (JPG).
3.	Using needle nose pliers, install lockwire on twelve screws (3) (JPG).
4.	Using needle nose pliers, install lockwire on four nuts (4) and two valve ports (5) on relief valve (6) (JPG).

NOTE

Follow-on Maintenance Action Required:

Test hydraulic motor (para 20-39).

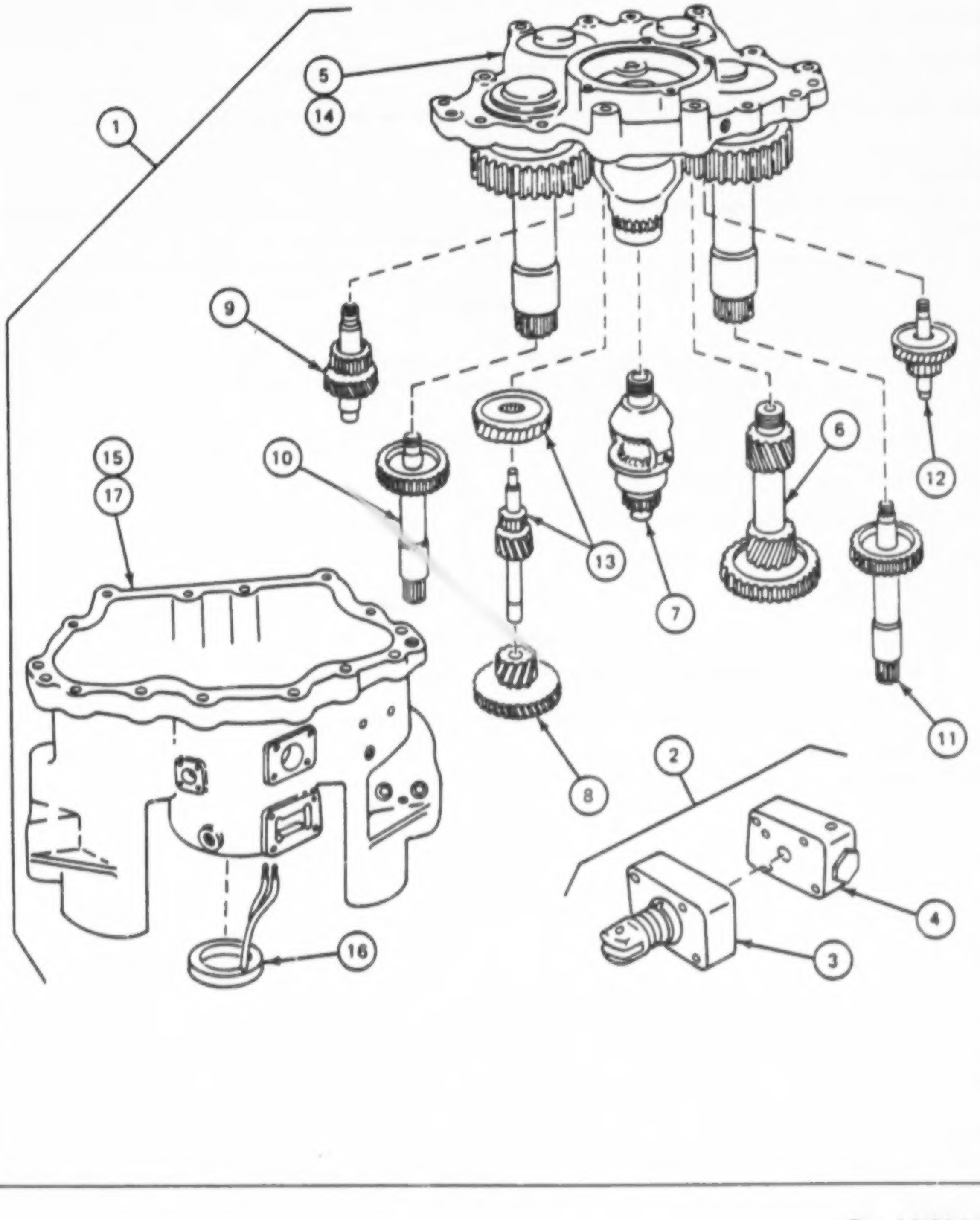
END OF TASK



Section 6. TRAVERSING GEAR BOX

20-44. MAINTENANCE PROCEDURES INDEX

	TASKS						
Equipment Item	Inspection	Test	Removal	Installation	Disassembly	Assembly	Repair
1. Traversing Gear Box	. . .	. . .	20-45	20-46	20-47	20-48	. . .
2. Gear Box Pump	20-49	20-50	20-51	20-52	20-53	20-54	. . .
3. Pump Body	. . .	. . .	20-55	20-56	20-57	20-58	. . .
4. Pump Plate	. . .	. . .	20-55	20-56	20-59	20-60	. . .
5. Upper Housing and Gear Train	20-61	. . .	20-62	20-63	20-64	20-65	. . .
6. Intermediate Gear	. . .	. . .	20-66	20-67	. . .	. . .	. . .
7. Differential	20-68	. . .	20-69	20-70	20-71	20-72	. . .
8. Lower Backlash Gear	. . .	. . .	20-73	20-79	. . .	. . .	. . .
9. Left Gear Shaft	. . .	. . .	20-75	20-76	. . .	. . .	. . .
10. Left Pinion Shaft	. . .	. . .	20-77	20-78	. . .	. . .	. . .
11. Right Pinion Shaft	. . .	. . .	20-79	20-80	. . .	. . .	. . .
12. Right Gear Shaft	. . .	. . .	20-81	20-82	. . .	. . .	. . .
13. Backlash Gear	. . .	. . .	20-83	20-84	. . .	. . .	. . .
14. Upper Housing	. . .	. . .	20-83	20-84	20-85	20-86	20-87
15. Lower Housing Group	. . .	. . .	20-62	20-63	20-88	20-89	. . .
16. Magnetic Brake	20-90	20-91	20-92	20-93	. . .	. . .	. . .
17. Lower Housing	20-94	. . .	20-92	20-93	20-95	20-96	20-97



20-45. TRAVERSING GEAR BOX REMOVAL PROCEDURE

TOOLS: 9/16" combination wrench
7/16" combination wrench

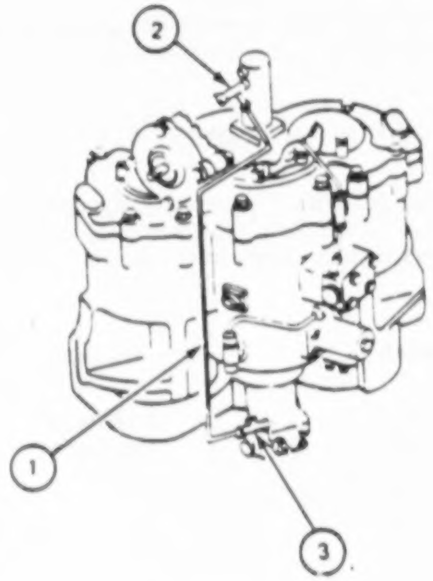
PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove no-bak

PRELIMINARY PROCEDURES: Remove turret traversing mechanism (para 20-3)

FRAME 1

Step	Procedure
	NOTE
	Turret traversing mechanism is outside vehicle. Parts must be removed from old gar box and put on new gear box (para 20-46).
1.	Using 7/16" and 9/16" wrenches, remove tube (1) from tee (2) and tee (3).
2.	Remove hydraulic motor (para 20-40).
3.	Remove no-bak (TM-20-2-3).
4.	Remove clutch (para 20-26).
	NOTE
	Follow-on Maintenance Action Required:
	Remove upper housing and gear train (para 20-62).
	END OF TASK



20-46. TRAVERSING GEAR BOX INSTALLATION PROCEDURE

TOOLS: 7/16" combination wrench
9/16" combination wrench

SUPPLIES: Plastic caps for hydraulic fittings
Preformed packing (MS 28778-4) (two)

PERSONNEL: One

REFERENCES: LO 9-2350-257-12 for procedure to add oil
TM 9-2350-257-20-2-3 for procedure to install no-bak

PRELIMINARY PROCEDURES: Install upper housing and gear train (para 20-63)

GENERAL INSTRUCTIONS:

NOTE

For traversing gear box to work properly, part numbers of clutch, no-bak, traversing gear box and hand traversing drive must match part numbers as follows:

Traversing Gear Box	Clutch	No-bak	Hand Traversing Drive
11637204	7972927	10940697	11674019
11637204-1	7972947-1	10951651	10911418-4

20-46. TRAVERSING GEAR BOX INSTALLATION PROCEDURE (CONT)

FRAME 1

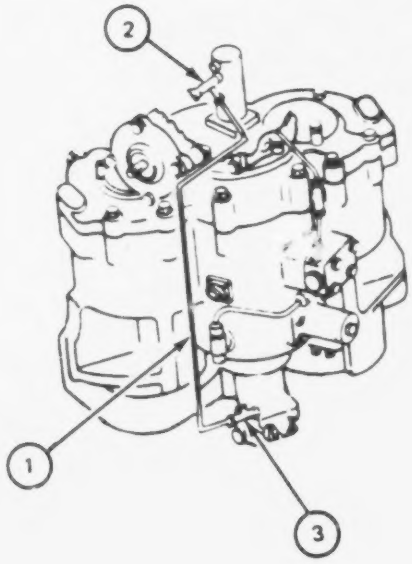
Step	Procedure
1.	Install clutch (para 20-27).
2.	Install no-bak (TM-20-2-3).
3.	Install hydraulic motor (para 20-41).
4.	Using 7/16" and 9/16" wrenches, connect tube (1) to tee (2) and tee (3).

NOTE

Follow-on Maintenance Action Required:

Fill traversing gear box with oil (LO).
Check for leaks and repair as required.

END OF TASK



20-47. TRAVERSING GEAR BOX DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove anti-backlash mechanism

PRELIMINARY PROCEDURES: Remove traversing gear box (para 20-45)

FRAME 1

Step	Procedure
1.	Remove anti-backlash mechanism (TM-20-2-3).
2.	Remove gear box pump (para 20-51).
3.	Remove upper housing and gear train (para 20-62).
4.	Disassemble lower housing group (para 20-88).
5.	Disassemble upper housing and gear train (para 20-64).
	END OF TASK

20-48. TRAVERSING GEAR BOX ASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to install anti-backlash mechanism

FRAME 1

Step	Procedure
1.	Assemble upper housing and gear train (para 20-65).
2.	Assemble lower housing group (para 20-89).
3.	Install upper housing and gear train (para 20-63).
4.	Install gear box pump (para 20-52).
5.	Install anti-backlash mechanism (TM-20-2-3).
	END OF TASK

20-49. GEAR BOX PUMP INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble gear box pump (para 20-53)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

Step	Procedure
	SUPPORT SHOP WORK
1.	Take gear box pump to shop where inspection equipment and spring tester are available.
2.	Dimensional check.

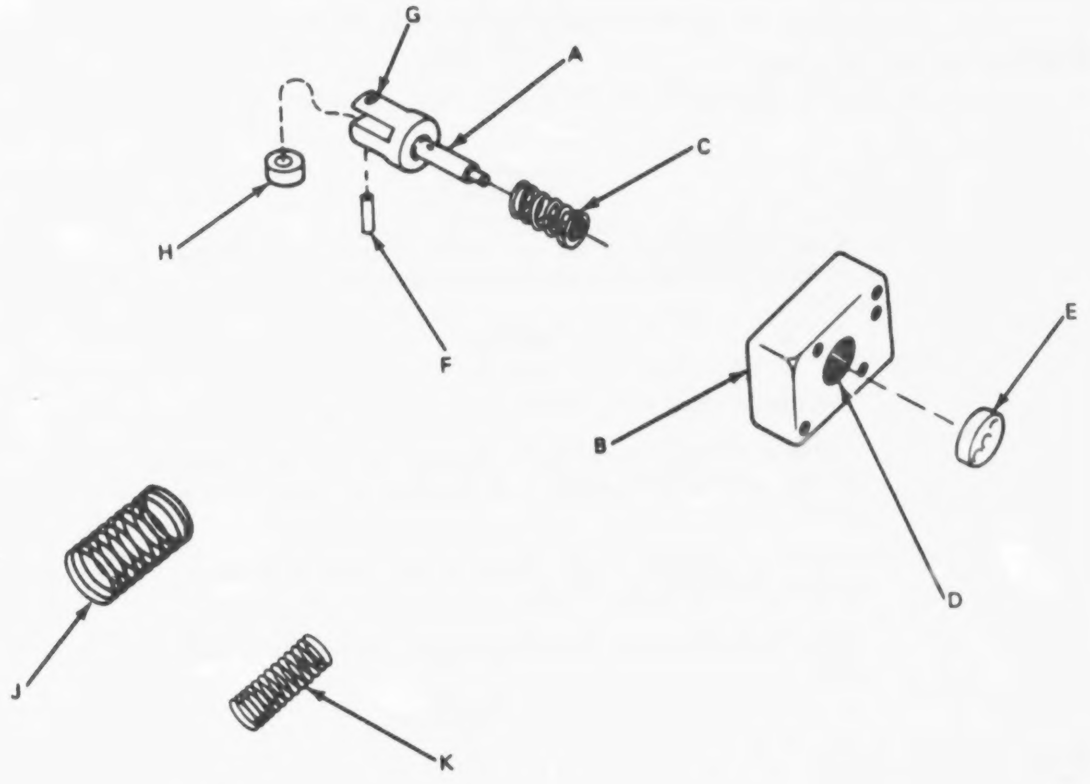
Reference Letter	Point of Measurement	Measurement
A	OD of pump stem	0.3737 to 0.3740
B	ID of pump body	0.3745 to 0.3750
C	Free length of plunger spring	1.380 in
C	Load required to compress spring to 17/32 in	7.7 to 9.3 oz
D	ID of body plunger bore	0.9843 to 0.9848
E	OD of plunger	0.9833 to 0.9838
F	OD of cam follower pin	0.246 to 0.250
G	ID of pin holes in pump head	0.251 to 0.252
H	ID of pump cam follower	0.251 to 0.252
J	Free length of inlet valve spring	1.06 in
J	Load required to compress spring to 27/32 in	0.9 to 1.1 oz
K	Free length of outlet valve spring	0.94 in
K	Load required to compress spring to 11/16 in	0.70 to 0.86 oz

NOTE

Tag all parts that are out of tolerance.

3. After support shop work, return gear box pump to turret shop.

END OF TASK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20-50. GEAR BOX PUMP TEST PROCEDURE

TEST EQUIPMENT: M3 oil pump
Pressure gauge (0 to 25 psi)
Suitable fittings, preformed packings, tools and hose

SUPPLIES: Rags (item 21, App. A)
Oil (item 18, App. A)
Container, 1 quart (two)

PERSONNEL: One

REFERENCES: JPG for procedure to use M3 pump

PRELIMINARY PROCEDURES: Assemble gear box (para 20-54)
Remove gear box pump (para 20-51)

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in ports. Dirt can damage equipment. Put plugs in ports to keep out dirt.

NOTE

Use rags to clean up oil spills.

Suitable fittings, preformed packings, tools, and hose should be used to connect test equipment to parts being tested.

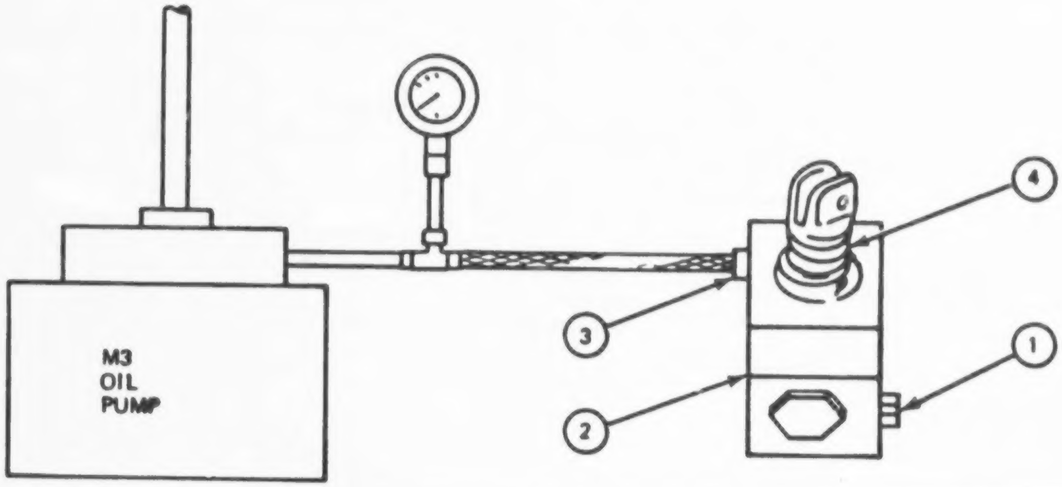
If normal indication is not obtained, gear box pump must be disassembled (para 20-53).

Refer to section index (para 20-44) for replacement of bad parts.

20-50. GEAR BOX PUMP TEST PROCEDURE (CONT)

FRAME 1

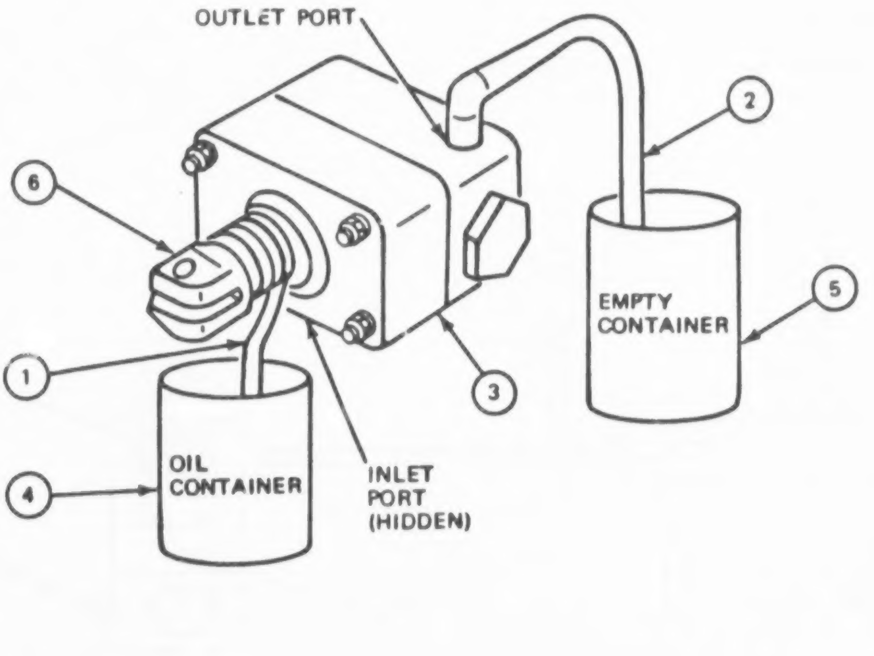
Step	Procedure
1.	Cap outlet port (1) in pump (2).
2.	Assemble M3 oil pump.
3.	Connect M3 oil pump and pressure gauge to inlet port (3) of pump (2).
	NOTE There should be no visible leaks except for small amount at plunger shaft (4).
4.	Using M3 oil pump, pressurize pump (2) to 25 psi (JPG). Check for leaks.
	NOTE If leakage was found, pump (2) is bad.
5.	Using M3 oil pump, reduce pressure in pump (2) to 0 psi (JPG).
6.	Uncap outlet port (1) in pump (2). Let excess oil drain.
7.	Disconnect M3 oil pump and pressure gauge from inlet port (3) of pump (2).
8.	Disassemble M3 oil pump.
	GO TO FRAME 2



20-50. GEAR BOX PUMP TEST PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Connect one hose (1) to inlet port and second hose (2) to outlet port of pump (3).
2.	Fill one container (4) with about one quart of oil.
3.	Put hose (1) from inlet port into container of oil (4) about two inches and hold inlet port of pump (3) between four and six inches above oil level in container.
4.	Put hose (2) from outlet port in empty container (5).
5.	Using hand, push in and release stem (6) until oil spurts out of hose (2) into empty container (5).
6.	Push in and release stem (6) until empty container is about 1/2 full to flush out hydraulic fluid used with M3 oil pump (frame 1). **NOTE** If oil does not spurt out, gear box pump is bad. END OF TASK



20-51. GEAR BOX PUMP REMOVAL PROCEDURE

TOOLS: 7/16" open end wrench
9/16" open end wrench
5/8" open end wrench
1/2" open end wrench
7/8" open end wrench
3/4" open end wrench

SUPPLIES: Drain pan (2 quart)
Rags (item 21, App. A)
Shipping nuts (MS 27151-11) (four)

PERSONNEL: One

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6
Turret Traversing Mechanism	FO-2	14

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

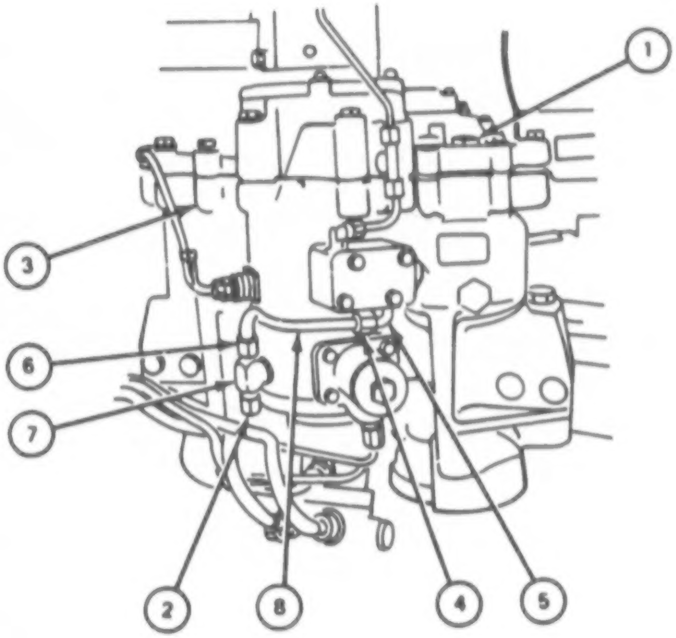
NOTE

Put plug on tube or cap on adapter to keep out dirt.
Use container and rags for oil spillage.

20-51. GEAR BOX PUMP REMOVAL PROCEDURE (CONT)

FRAME 1

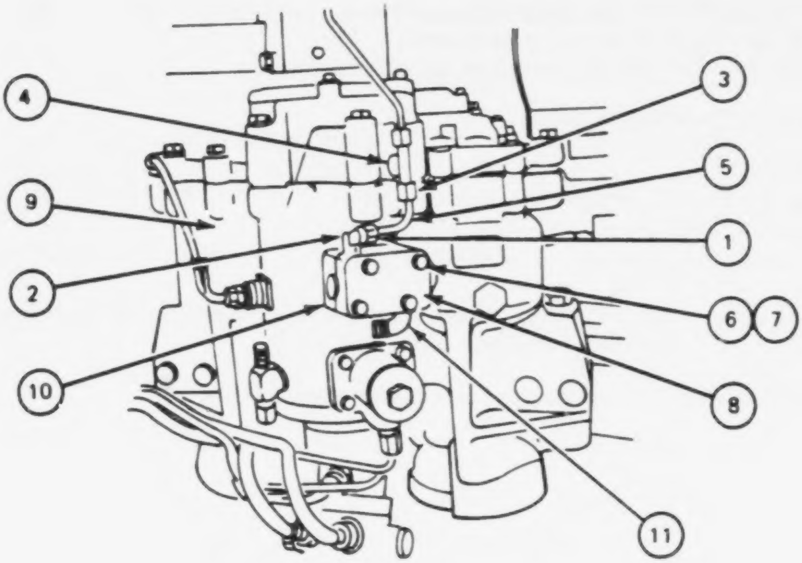
Step	Procedure
	NOTE Drain pan should be placed under drain plug (2) of traversing gear box (3).
1.	Using 7/8" wrench, loosen filler plug (1).
2.	Using 3/4" wrench, remove drain plug (2) from traversing gear box (3).
3.	Drain lubricating oil into drain pan.
	NOTE Keep dirt from getting in tubing or parts. Dirt can damage pump.
4.	Using 3/4" wrench, put drain plug (2) back on traversing gear box (3).
5.	Using 3/4" wrench on nut (4), disconnect nut but do not loosen elbow (5).
6.	Using 3/4" wrench on nut (6), disconnect nut but do not loosen tee (7).
7.	Remove tube (8).
	GO TO FRAME 2



20-51. GEAR BOX PUMP REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using 5/8" wrench on nut (1), disconnect nut but do not loosen elbow (2).
2.	Using 5/8" wrench on nut (3), disconnect nut but do not loosen tee (4).
3.	Remove tube (5).
4.	Using 7/16" wrench, remove four screws (6) and four lockwashers (7) that attach gear box pump (8) to traversing gear box (9).
	NOTE Pump (8) may separate when removed.
5.	Remove gear box pump (8) and gasket (10). Throw gasket away.
	NOTE Do steps 6, 7 and 8 if gear box pump is bad.
6.	Using 7/16" and 1/2" wrench, hold gear box pump (8) together with four screws (6), four lockwashers (7), and four shipping nuts.
7.	Using 7/16" wrench, remove elbow (2) from gear box pump (8).
8.	Using 9/16" wrench, remove elbow (11) from gear box pump (8).
	END OF TASK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20-52. GEAR BOX PUMP INSTALLATION PROCEDURE

TOOLS: 7/16" combination wrench
1/2" combination wrench
9/16" combination wrench
3/4" combination wrench
5/8" combination wrench
3/8" drive torque wrench (0 to 150 inch-pounds)
7/16" socket (3/8" drive)

SUPPLIES: Oil (item 18, App. A)

PERSONNEL: One

REFERENCES: LO 9-2350-257-12 for procedure to add oil
JPG for procedure to use torque wrench
TM 9-2350-257-10 for procedure to traverse turret

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Turret Traverse Lock	FO-4	6
Turret Traversing Mechanism	FO-2	14

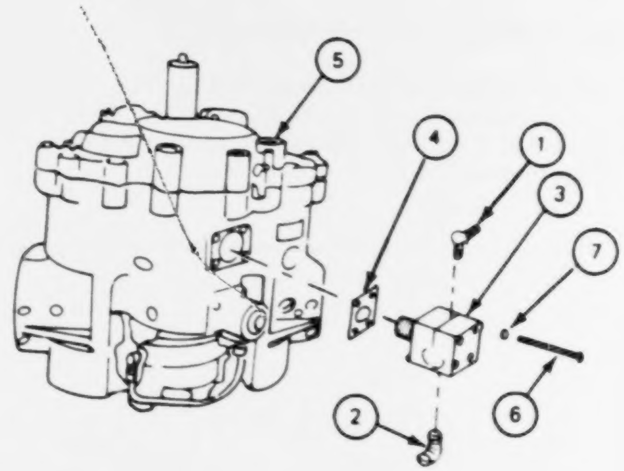
EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traverse lock set to LOCKED

PRELIMINARY PROCEDURES: Assemble gear box pump (para 20-54)

20-52. GEAR BOX PUMP INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	**Procedure**
	NOTE Do steps 1 and 2 if new gear box pump is to be installed.
1.	Using 7/16" and 9/16" wrenches, put elbows (1) and (2) on new pump (3) in positions shown.
2.	Using 7/16" and 1/2" wrenches, remove four shipping nuts from new pump (3).
	NOTE Put side of pump with IN stamped on it to right.
3.	Using torque wrench and 7/16" socket, attach pump (3) and gasket (4) to gear box assembly housing (5) with four screws (6) and four lockwashers (7). Torque four screws (6) to between 60 and 70 inch-pounds (JPG). GO TO FRAME 2



20-52. GEAR BOX PUMP INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Remove plugs from tube (1) and caps from elbow (2) and tee (3).
2.	Using hands, attach tube (1) to elbow (2) and tee (3) and tighten nuts (4) and (5) finger tight.
3.	Using 3/4" wrench, tighten nut (4) on elbow (2).
4.	Using 3/4" wrench, tighten nut (5) on tee (3).
5.	Remove plugs from tube (6) and caps from tee (7) and elbow (8).
6.	Using hands, attach tube (6) to tee (7) and elbow (8) and tighten nuts (9) and (10) finger tight.
7.	Using 5/8" wrench, tighten nut (9) on tee (7).
8.	Using 5/8" wrench, tighten nut (10) on elbow (8).

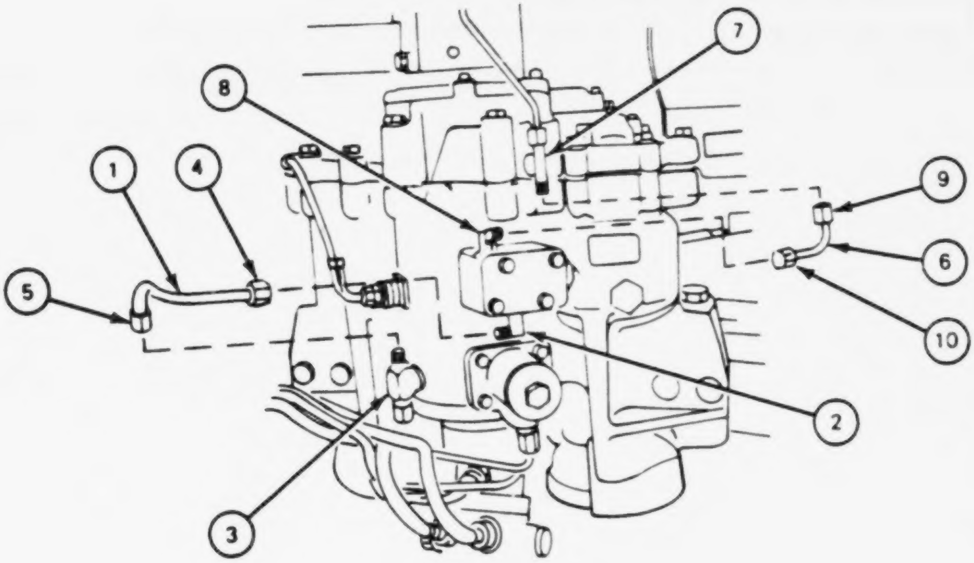
NOTE

Do the following tasks if this procedure completes the maintenance of the traversing mechanism system. If other maintenance must be done, make sure following tasks are completed after other maintenance.

Follow-on Maintenance Action Required:

Fill traversing mechanism with oil (LO).
Check for leaks and repair as required.
Traverse turret in power mode to check operation of gear box pump (TM-10).

END OF TASK



20-53. GEAR BOX PUMP DISASSEMBLY PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove gear box pump (para 20-51)
Test gear box pump (para 20-50)

FRAME 1

Step	Procedure
1.	Remove pump body (para 20-55).
2.	Disassemble pump body (para 20-57).
3.	Disassemble pump plate (para 20-59).
	END OF TASK

20-54. GEAR BOX PUMP ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble pump body (para 20-58).
2.	Assemble pump plate (para 20-60).
3.	Install pump body (para 20-56). **NOTE** Follow-on Maintenance Action Required: Test gear box pump (para 20-50). END OF TASK

20-55. PUMP BODY OR PUMP PLATE REMOVAL PROCEDURE

TOOLS: 7/16" combination wrench
1/2" combination wrench
Plastic face hammer

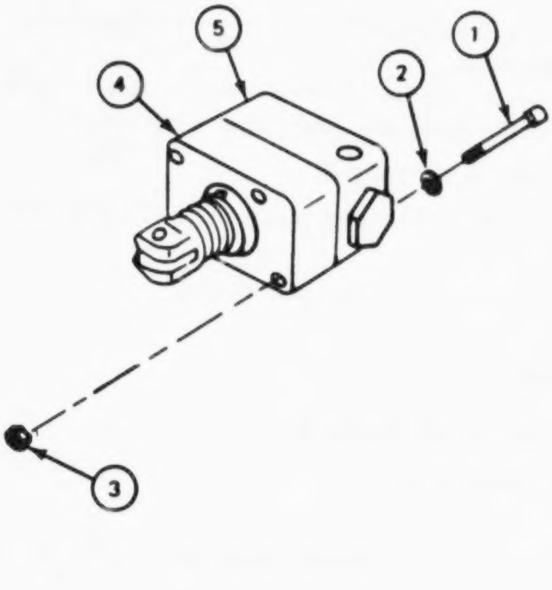
PERSONNEL: One

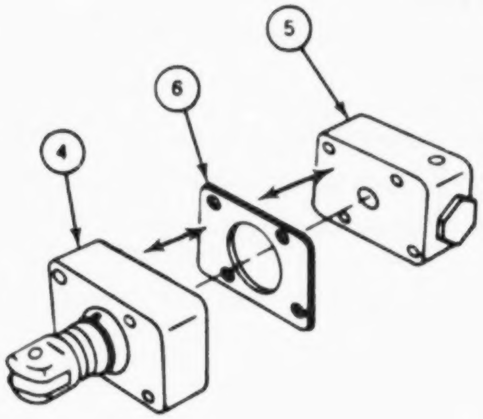
PRELIMINARY PROCEDURES: Remove gear box pump (para 20-51)
Test gear box pump (para 20-50)

20-55. PUMP BODY OR PUMP PLATE REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using 7/16" and 1/2" wrench, remove four screws (1), four lockwashers (2) and four shipping nuts (3) that hold pump body (4) to pump plate (5).
2.	Using hammer, carefully tap pump body (4) from pump plate (5).
3.	Using hands, remove pump body (4) from pump plate (5). Remove gasket (6).
	NOTE Follow-on Maintenance Action Required: Disassemble pump body (para 20-57). Disassemble pump plate (para 20-59).
	END OF TASK





20-56. PUMP BODY OR PUMP PLATE INSTALLATION PROCEDURE

TOOLS: 7/16" combination wrench
1/2" combination wrench

SUPPLIES: Lockwashers (MS 35387-44) (four)
Gasket (8734031)
Gasket (8734032)
Nuts (MS 27151-11) (four)
Screws (MS 90725-17) (four)

PERSONNEL: One

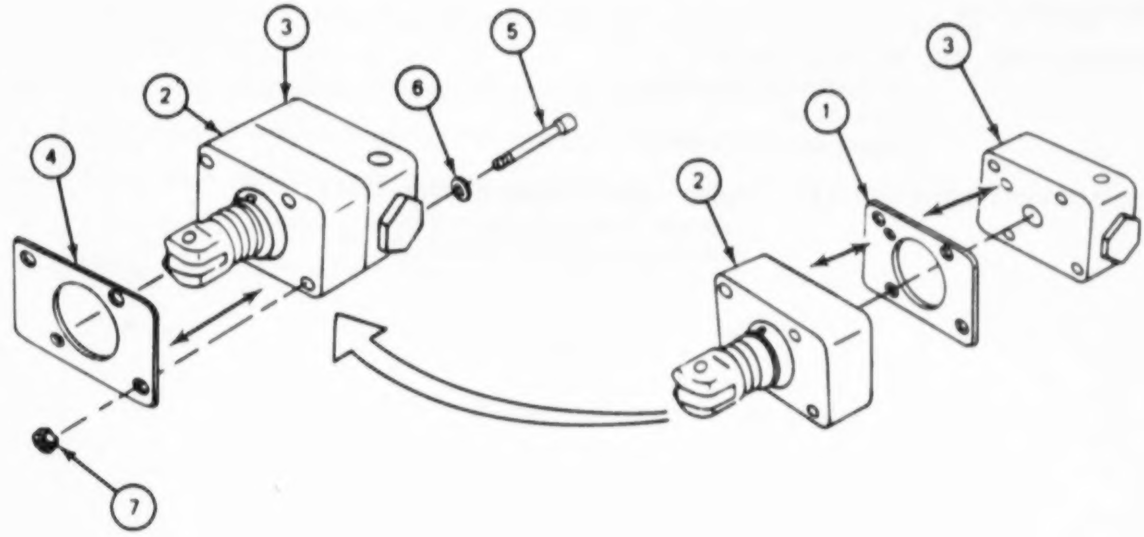
PRELIMINARY PROCEDURES: Assemble pump body (para 20-58)
Assemble pump plate (para 20-60)

CAUTION

Keep dirt from getting in parts. Dirt can damage equipment.

FRAME 1

Step	Procedure
1.	Using hands, line up holes in gasket (1), pump body (2), and pump plate (3).
2.	Using hands, line up holes in gasket (4) with pump body (2).
3.	Using hands, attach gasket (4) to body (2), gasket (1), and pump plate (3) with four screws (5), four lockwashers (6), and four nuts (7).
4.	Using 7/16" and 1/2" wrench, tighten four nuts (7) to four screws (5). **NOTE** Follow-on Maintenance Action Required: Test gear box pump (para 20-50). END OF TASK



20-57. PUMP BODY DISASSEMBLY PROCEDURE

TOOLS: External retaining ring pliers
Long round nose pliers
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

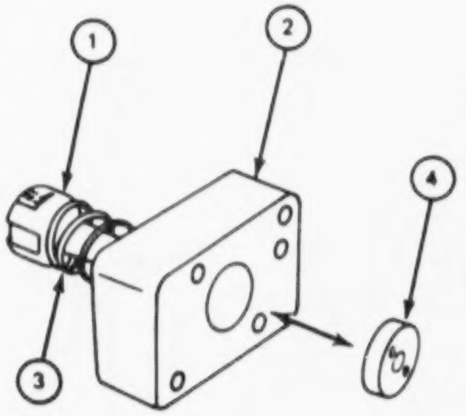
REFERENCES: JPG for procedures to:
Use retaining ring pliers
Clean parts
Inspect and repair parts

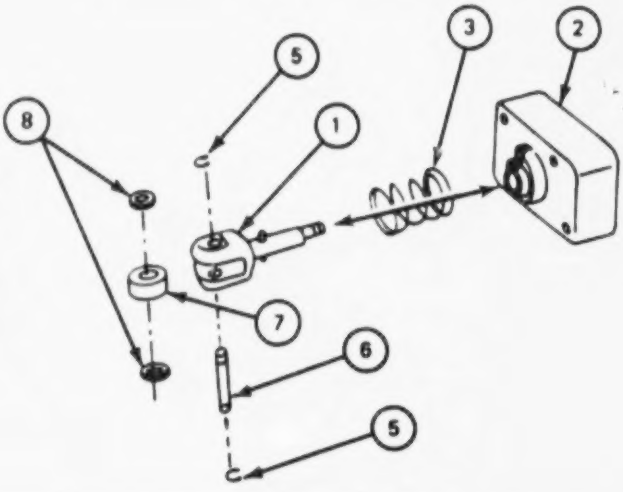
PRELIMINARY PROCEDURES: Remove gear box pump (para 20-51)
Test gear box pump (para 20-50)
Remove pump body (para 20-55)

20-57. PUMP BODY DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	CAUTION Be careful when removing stem (1) from pump body (2). It is under spring tension.
1.	Using hands, push stem (1) in pump body (2) and hold in against spring (3) while performing step 2.
2.	Using long nose pliers, remove plunger (4) slowly from stem (1).
3.	Using hands, remove stem (1) and spring (3) from pump body (2).
4.	Using pliers, remove two retaining rings (5) from pin (6) (JPG).
5.	Using hands, remove pin (6) from stem (1).
6.	Using hands, remove cam follower (7) and two washers (8).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-49).
	END OF TASK





20-58. PUMP BODY ASSEMBLY PROCEDURE

TOOLS: External retaining ring pliers
8 ounce ball peen hammer
Center punch
Long round nose pliers

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use retaining ring pliers
Stake

PRELIMINARY PROCEDURES: Inspect pump body (para 20-49)

GENERAL INSTRUCTIONS:

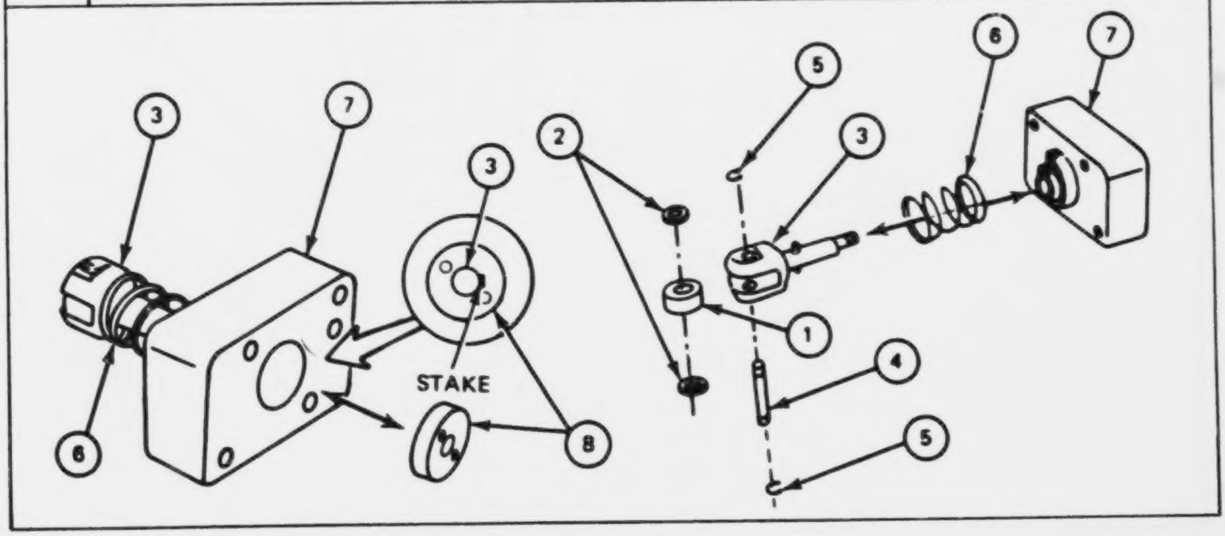
CAUTION

Keep dirt from getting in parts. Dirt can damage equipment.

20-58. PUMP BODY ASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hands, put cam follower (1) with two washers (2), one on each side of cam follower, in stem (3).
2.	Using hands, put pin (4) in stem (3), holding cam follower (1) and two washers (2) in place.
3.	Using retaining ring pliers, put two retaining rings (5) on pin (4) (JPG).
4.	Using hands, put spring (6) on stem (3) and put both in pump body (7).
	CAUTION Be careful when installing stem (3) in pump body (7), it is under spring tension.
5.	Using hands, push on stem (3) and spring (6) and put plunger (8) on stem.
6.	Using long nose pliers, attach stem (3) to pump body (7) with plunger (8).
7.	Using center punch and hammer, lightly stake stem (3) to plunger (8) (JPG).
	NOTE Follow-on Maintenance Action Required: Install pump body (para 20-56).
	END OF TASK



20-59. PUMP PLATE DISASSEMBLY PROCEDURE

TOOLS:
1" combination wrench
External retaining ring pliers
20 ounce ball peen hammer
Vise with brass caps
Wooden dowel 3/8" diameter 4" length
Scraper
Stiff bristled brush
Fine stone

SUPPLIES:
Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

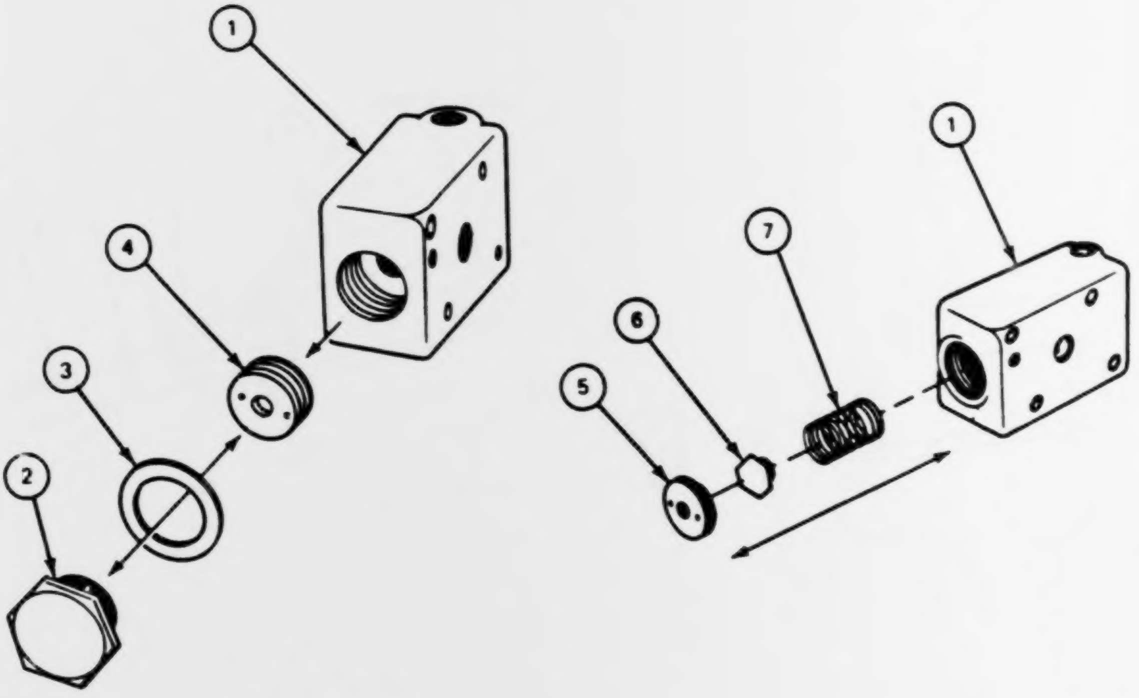
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES:
Remove gear box pump (para 20-52)
Test gear box pump (para 20-50)
Remove pump body (para 20-55).

20-59. PUMP PLATE DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Put pump plate (1) in vise.
2.	Using 1" wrench, remove plug (2) from pump plate (1). Remove gasket (3) from plug (1).
3.	Using retaining ring pliers, remove lock plug (4) from pump plate (1) (JPG).
4.	Using retaining ring pliers, slowly remove inlet valve seat (5) from pump plate (1) (JPG).
5.	Remove pump plate (1) from vise.
6.	Using hands, remove inlet valve (6) and spring (7) from pump plate (1).
7.	Place pump plate (1) in vise.
	GO TO FRAME 2



20-59. PUMP PLATE DISASSEMBLY PROCEDURE (CONT)

FRAME 2

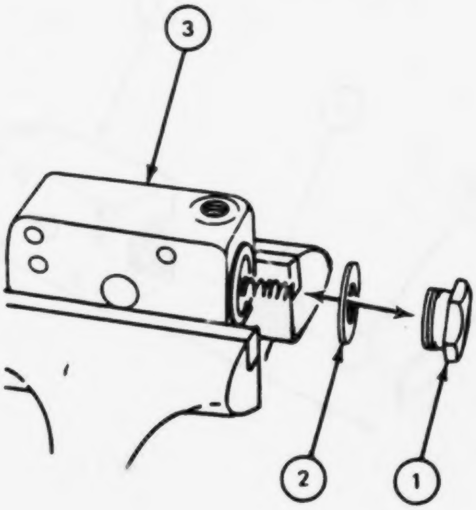
Step	Procedure
1.	Using wrench, remove plug (1) and gasket (2) from pump plate (3). Remove gasket (2) from plug (1).
2.	Using hands, remove spring (4) and outlet valve (5).
3.	Remove pump plate (3) from vise.
4.	Using hammer and wood dowel, put dowel in end opposite plug (1) and drive out valve seat (6).

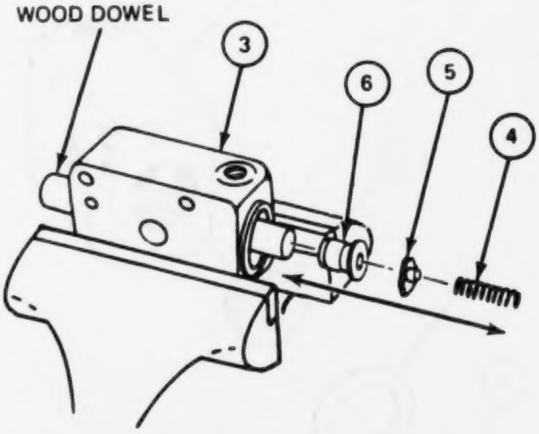
NOTE

Follow-on Maintenance Action Required:

Clean all parts (JPG).
Inspect and repair all parts (JPG).
Do detail inspection of parts (para 20-49).

END OF TASK





20-60. PUMP PLATE ASSEMBLY PROCEDURE

TOOLS: 1" combination wrench
External retaining ring pliers
20 ounce ball peen hammer
Vise with caps
Wooden dowel 3/8" diameter 4" length

PERSONNEL: One

REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Inspect pump plate (para 20-49)

GENERAL INSTRUCTIONS:

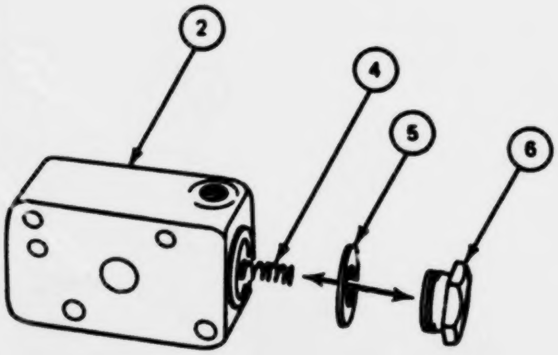
CAUTION

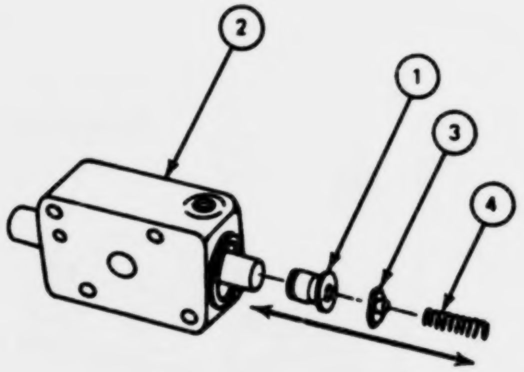
Keep dirt from getting in parts. Dirt can damage equipment.

20-60. PUMP PLATE ASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hammer and wood dowel, drive outlet valve seat (1) into end of pump plate (2).
2.	Using hands, put outlet valve (3) with small diameter facing out in pump plate (2).
3.	Using hands, put spring (4) on small diameter of outlet valve (3) in pump plate (2).
4.	Using hands, put gasket (5) on plug (6). Attach plug (6) to pump plate (2) finger tight.
5.	Place pump plate (2) in vise.
6.	Using wrench, tighten plug (6) with gasket (5) to pump plate (2).
7.	Remove pump plate (2) from vise.
	GO TO FRAME 2

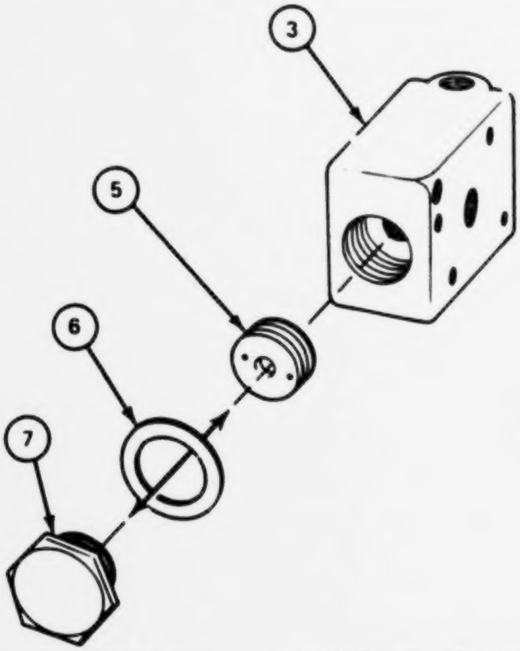


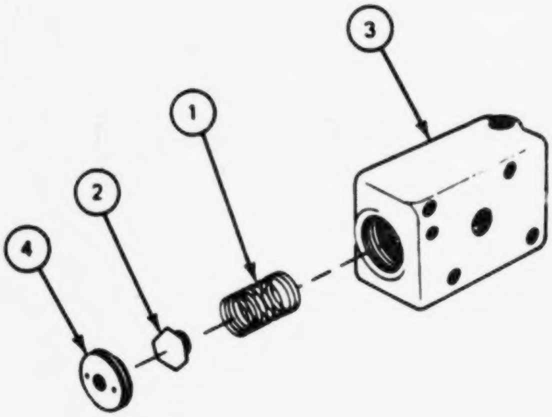


20-60. PUMP PLATE ASSEMBLY PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using hands, put spring (1) and inlet valve (2), with small diameter facing spring, in pump plate (3).
2.	Using retaining ring pliers, put inlet valve seat (4) in pump plate (3) (JPG). Screw in valve seat as far as it will go.
3.	Using retaining ring pliers, put lock plug (5) in pump plate (3) (JPG). Screw in lock plug as far as it will go.
4.	Using hands, put gasket (6) on plug (7). Attach plug to pump plate finger tight.
5.	Place pump plate (3) in vise.
6.	Using wrench, tighten plug (7) with gasket (6) to pump plate (3).
7.	Remove pump plate (3) from vise.
	NOTE Follow-on Maintenance Action Required: Install pump plate (para 20-56).
	END OF TASK





20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble upper housing and gear train as required (para 20-64)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

Frames 2 thru 7 should be taken to support shop at same time for inspection.

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

a. Left Gear Shaft and Right Gear Shaft

FRAME 1

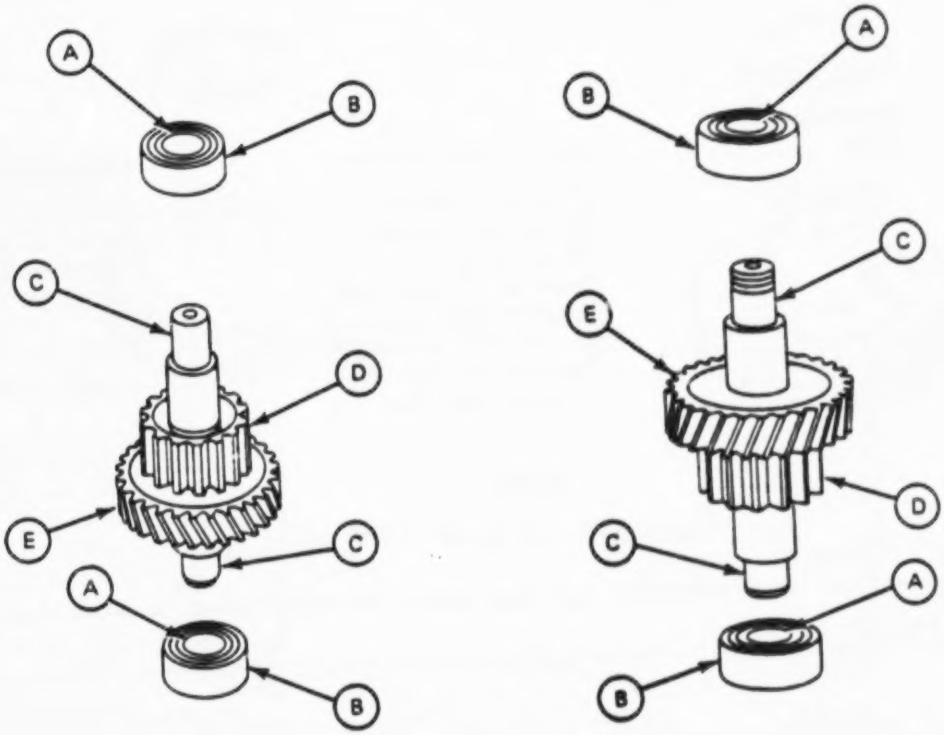
Step	Procedure
	SUPPORT SHOP WORK
1.	Take left and right gear and four bearings to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	ID of ball bearing	0.9839 to 0.9843
B	OD of ball bearing	2.0467 to 2.0472
C	OD of shaft shoulder	0.9828 to 0.9834
D	Diameter of gear over 0.2880 inch pins	2.8786 to 2.8823
E	Diameter of gear over 0.2160 inch pins	4.0789 to 4.0828

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return left and right gear and four bearings to turret shop.
	GO TO FRAME 2


A
B
C
D
E
C
A
B
A
B
C
E
D
C
A
B

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

b. Left Pinion Shaft and Right Pinion Shaft

FRAME 2

Step	Procedure
	SUPPORT SHOP WORK
1.	Take left and right pinion and two bearings to shop where inspection equipment is available.
2.	Dimensional check.

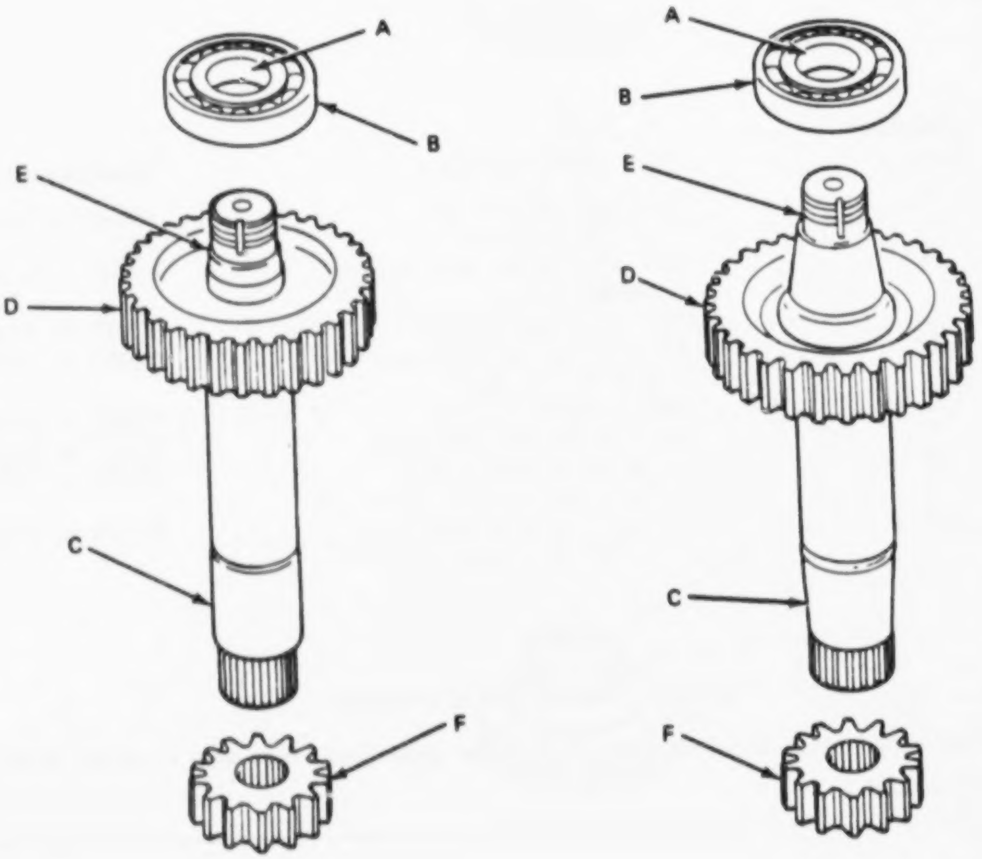
Reference Letter	Point of Measurement	Measurement
A	ID of ball bearing	1.3775 to 1.3780
B	OD of ball bearing	2.8341 to 2.8346
C	OD of shaft	2.1230 to 2.1235
D	Diameter of gear over 0.2880 inch pins	5.7343 to 5.7367
E	OD of shaft assembly	1.3765 to 1.3770
F	Diameter of gear over 0.4800 inch pins	4.7630 to 4.7714

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return left and right pinion and two bearings to turret shop.

GO TO FRAME 3


A
B
E
D
C
F
A
B
E
D
C
F

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

c. Backlash Gear Shaft and Lower Backlash Gear

FRAME 3

Step | **Procedure**

SUPPORT SHOP WORK

1. Take backlash gear shaft, upper gear, and lower gear to shop where inspection equipment is available.

2. Dimensional check.

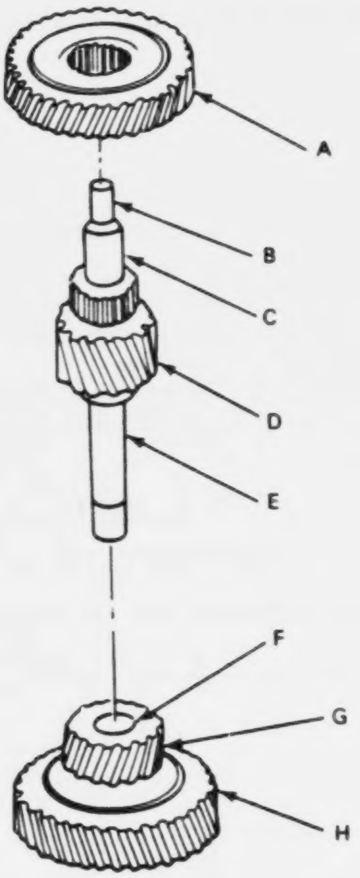
Reference Letter	Point of Measurement	Measurement
A	Diameter of gear over 0.1728 inch pins	4.0640 to 4.0680
B	OD of backlash shaft bearing surface	0.4987 to 0.4992
C	OD of backlash shaft	0.7489 to 0.7494
D	Diameter of backlash gear over 0.2160 pins	2.0707 to 2.0771
E	OD of backlash shaft	0.7489 to 0.7494
F	ID of lower backlash gear	0.7517 to 0.7532
G	Diameter of gear over 0.2160 inch pins	2.0707 to 2.0741
H	Diameter of gear over 0.1728 inch pins	4.0639 to 4.0680

NOTE

Tag all parts that are out of tolerance.

3. After shop work, return backlash gear shaft, upper gear, and lower gear to turret shop.

GO TO FRAME 4


A
B
C
D
E
F
G
H

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

d. Differential

FRAME 4

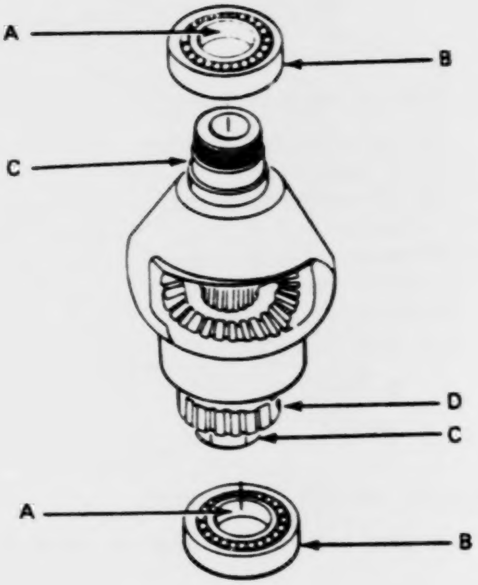
Step	Procedure
	SUPPORT SHOP WORK
1.	Take differential and two bearings to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	ID of ball bearing	1.1807 to 1.1811
B	OD of ball bearing	2.1649 to 2.1654
C	OD of differential bearing surface	1.1797 to 1.1802
D	Diameter of differential over 0.1728 inch pins	2.0340 to 2.0384

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After shop work, return differential and two bearings to turret shop.
	GO TO FRAME 5


A
B
C
D
C
A
B

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

e. Intermediate Gear

FRAME 5

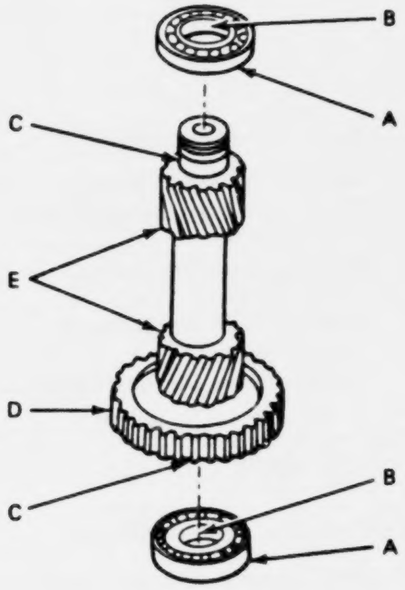
Step	Procedure
	SUPPORT SHOP WORK
1.	Take intermediate gear and two bearings to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	OD of ball bearing	1.9995 to 2.0000
B	ID of ball bearing	0.9996 to 1.0000
C	OD of intermediate shaft shoulder	0.9985 to 0.9990
D	Diameter of gear over 0.1728 inch pins	3.5277 to 3.5356
E	Diameter of gear over 0.1728 inch pins	1.7480 to 1.7514

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After shop work, return intermediate gear and two bearings to turret shop. GO TO FRAME 6


B
A
C
E
D
C
B
A

20-61. UPPER HOUSING AND GEAR TRAIN INSPECTION PROCEDURE (CONT)

f. Upper Housing

FRAME 6

Step | **Procedure**

SUPPORT SHOP WORK

1. Take upper housing to shop where inspection equipment is available.

2. Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	Housing bore for bearing	2.1659 to 2.1664
B	ID of bushing (installed in housing)	0.7499 to 0.7509
C	Housing bore for bearing (two places)	2.0477 to 2.0482
D	Housing bore for bearing (two places)	2.8351 to 2.8356
E	Housing bore for bearing	2.005 to 2.0010

NOTE

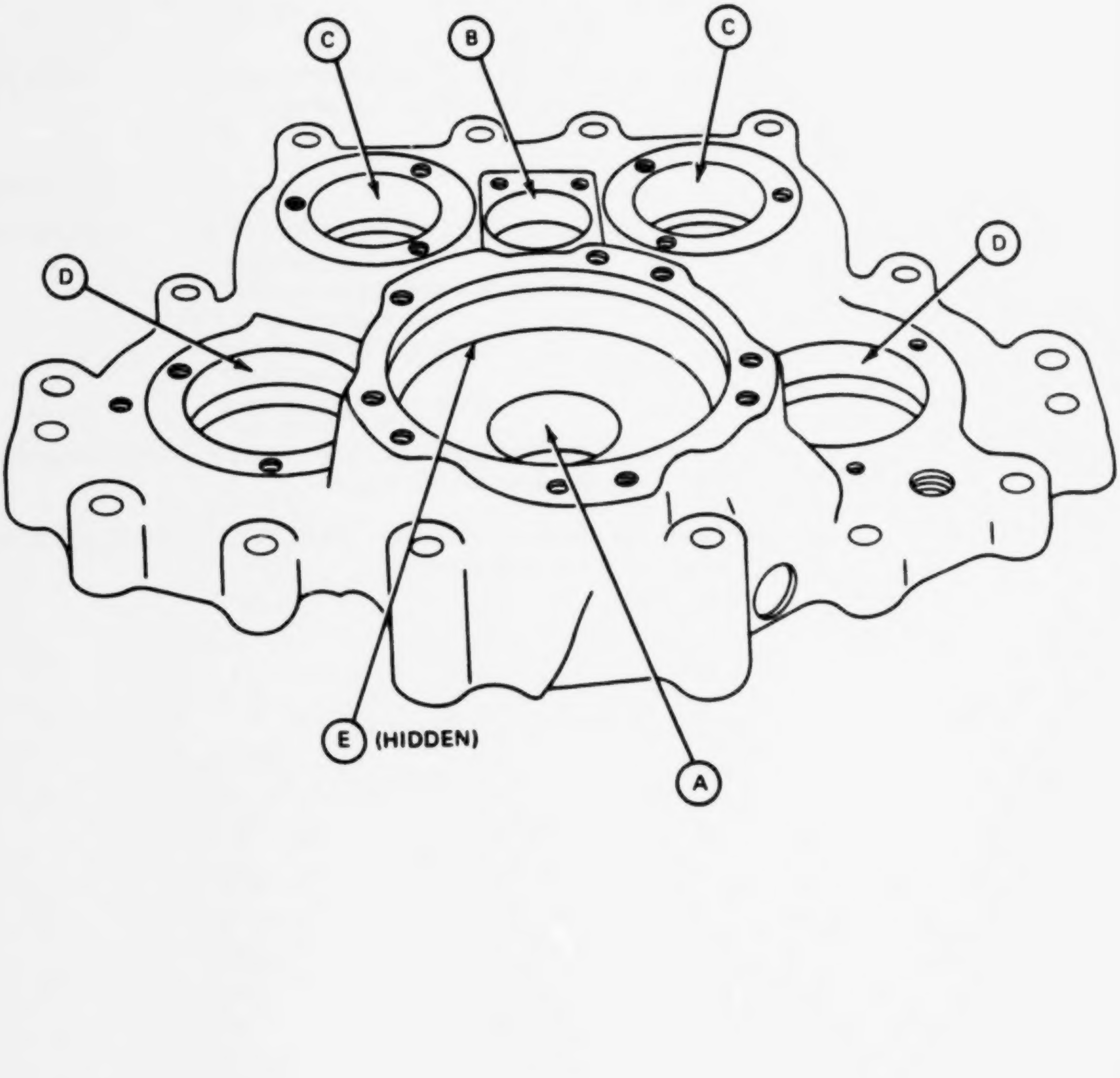
Tag all parts that are out of tolerance.

3. After support shop work, return upper housing to turret shop.

NOTE

If bushing measurement is out of tolerance, replace bushing (para 20-87).

END OF TASK


C
B
C
D
D
E (HIDDEN)
A

20-62. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP REMOVAL PROCEDURE

TOOLS: 3/8" drive hinged handle
5/16" socket (3/8" drive)
External retaining ring pliers
5/8" socket (1/2" drive)
Pry bar (two)
Putty knife
1/2" drive ratchet
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: Two

REFERENCES: TM 9-2350-257-20-2-3 for procedures to:
Remove pin lock
Remove anti-backlash mechanism
JPG for procedures to:
Use retaining ring pliers
Clean parts
Inspect and repair parts

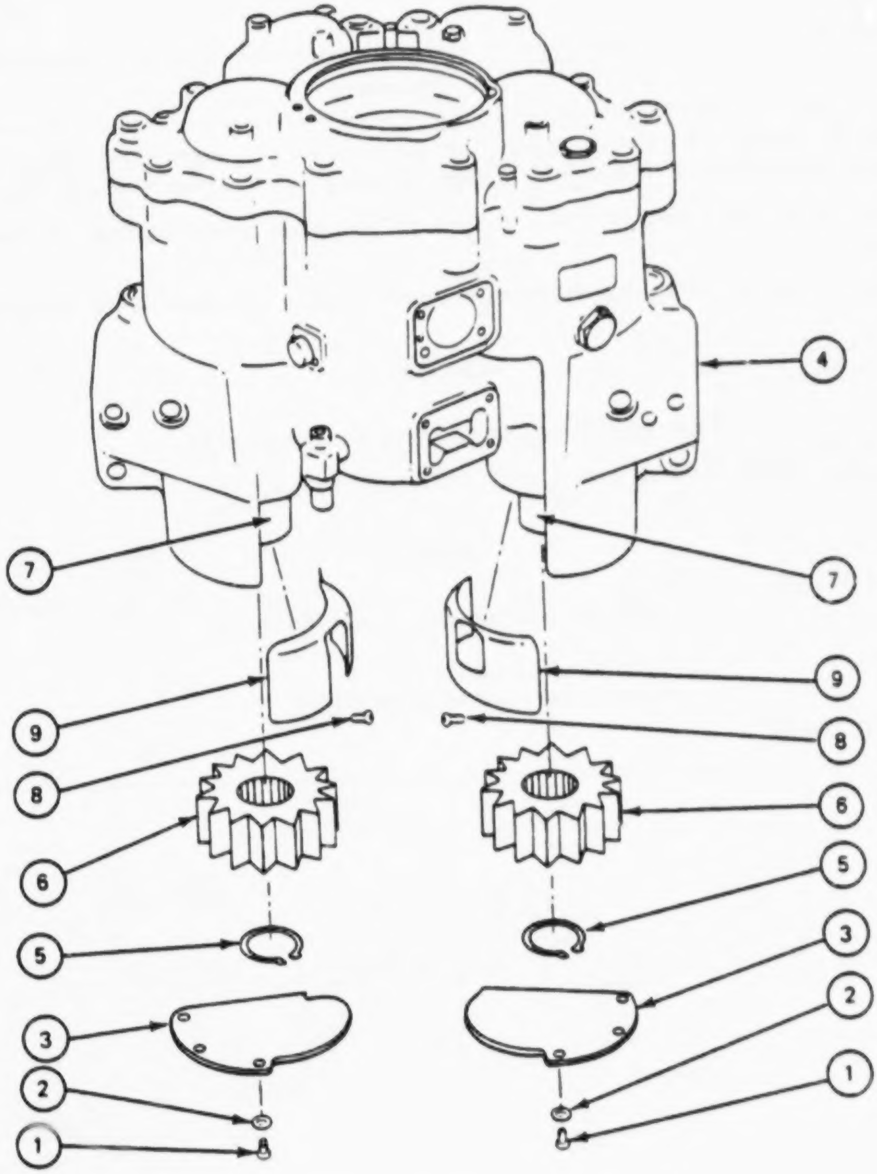
EQUIPMENT CONDITION: Pin lock removed (TM-20-2-3)
Anti-backlash mechanism removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Remove traversing gear box (para 20-45)
Remove gear box pump (para 20-51)

20-62. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP REMOVAL PROCEDURE (CONT)

FRAME 1

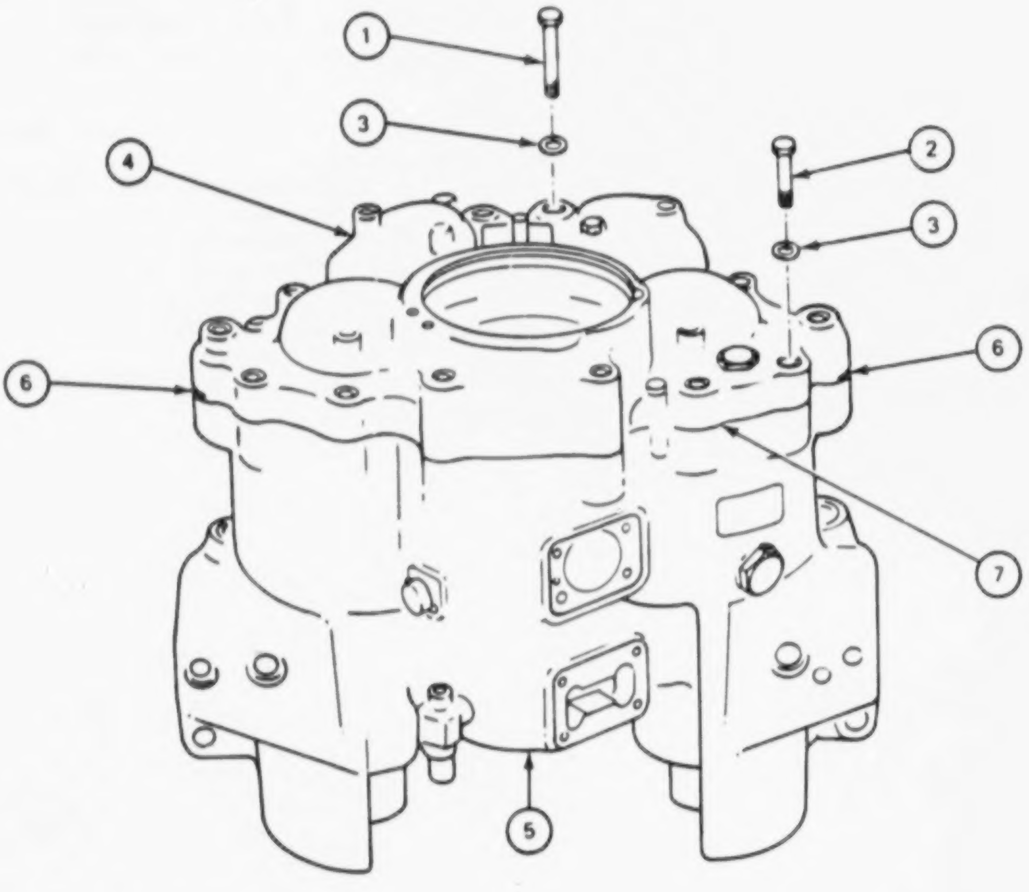
Step	Procedure
1.	Soldier A: Using 5/16" socket and hinged handle, remove six screws (1) and six lockwashers (2) that attach two guard plates (3) to gear box (4). Remove two guard plates.
2.	Using pliers, remove two retaining rings (5) that attach two drive pinions (6) to two shafts (7). Remove two drive pinions (JPG).
3.	Using 5/16" socket and hinged handle, remove four screws (8) with attached lockwashers that attach two guards (9) to gear box (3). Remove two guards. GO TO FRAME 2



20-62. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Soldier B: Using 5/8" socket, remove six long screws (1), eight short screws (2), and fourteen lockwashers (3) that attach upper housing (4) to lower housing (5).
2.	Soldiers A and B: Using pry bars in slots (6), separate upper housing (4) from lower housing (5).
3.	Soldiers A and B: Using hands, remove upper housing (4) from lower housing (5).
	NOTE Gasket (7) may remain on lower housing (5).
4.	Using putty knife, remove gasket (7) from upper housing (4).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG).
	END OF TASK



20-63. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP INSTALLATION PROCEDURE

TOOLS: External retaining ring pliers
Adapter (NSN 5120-00-588-1986) (two)
5/16" combination wrench
5/8" socket (3/8" drive)
3/8" drive torque wrench (0 to 50 foot-pounds)
3/8" drive ratchet

SUPPLIES: Gasket (10911968)
Wood block (4" x 4" x 18")
Wood block (2" x 4" x 6") (two)

PERSONNEL: Two

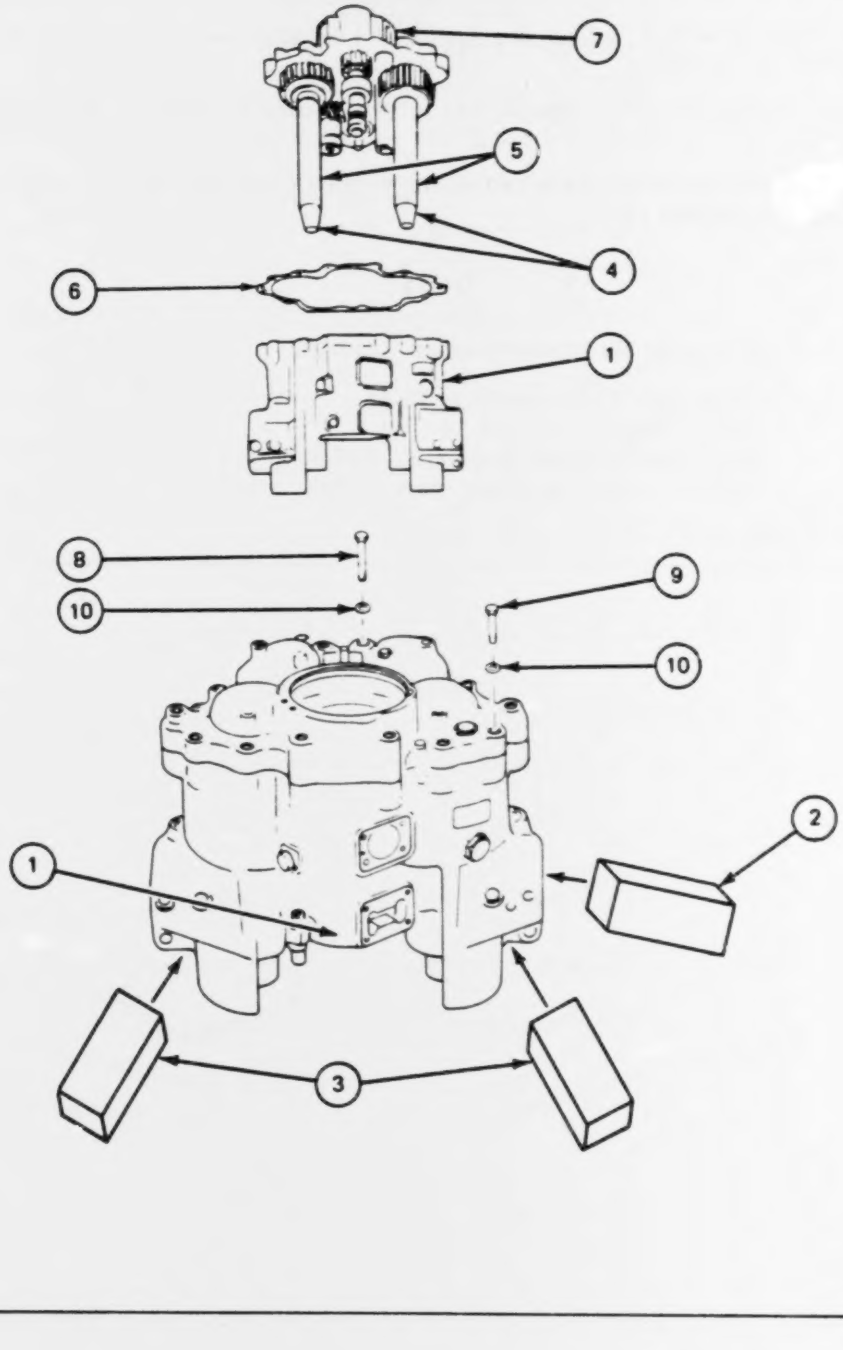
REFERENCES: JPG for procedures to:
  Use torque wrench
  Use retaining ring pliers
TM 9-2350-257-20-2-3 for procedures to:
  Install pinlock
  Install anti-backlash mechanism

PRELIMINARY PROCEDURES: Assemble lower housing group (para 20-89)
Assemble upper housing and gear train (para 20-65)

20-63. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP INSTALLATION PROCEDURE (CONT)

FRAME 1

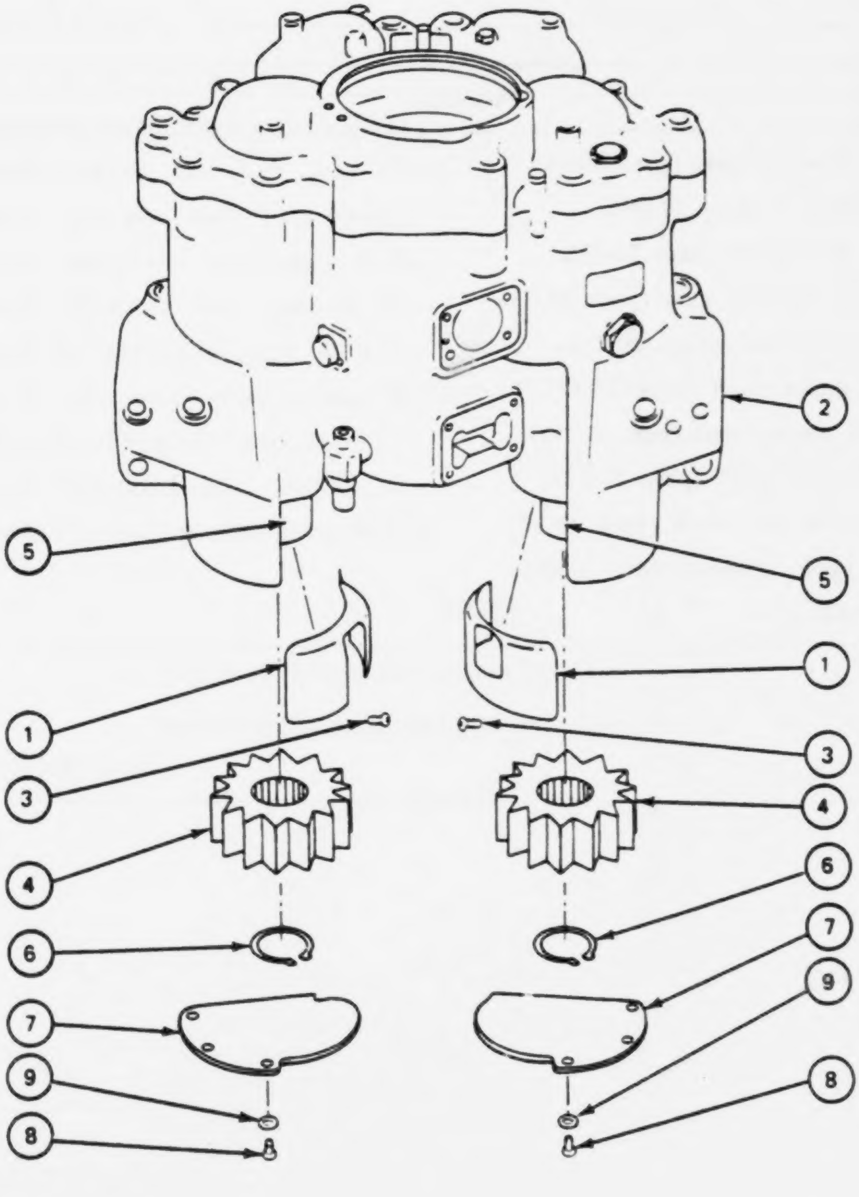
Step	Procedure
1.	Soldier A: Lift and hold lower housing (1) for steps 2 and 3.
2.	Soldier B: Place wood block (2) (4" x 4" x 18") under lower housing (1).
3.	Soldier B: Place two wood blocks (3) (2" x 4" x 6") under lower housing (1).
4.	Soldier A: Put two adapters (4) on ends of two pinion shafts (5).
5.	Soldier B: Put gasket (6) on lower housing (1).
6.	Soldiers A and B: Put upper housing (7) in lower housing (1).
7.	Soldier A: Using socket wrench, attach upper housing (7) to lower housing (1) with six long screws (8), eight short screws (9), and fourteen lockwashers (10).
8.	Soldier B: Using torque wrench, torque screws (8) and (9) to between 27 and 32 foot-pounds (JPG).
9.	Using hands, remove two adapters (4) from ends of pinion shaft (2).
	GO TO FRAME 2



20-63. UPPER HOUSING AND GEAR TRAIN OR LOWER HOUSING GROUP INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using combinaton wrench, attach two guards (1) to gear box (2) with four screws (3) with attached lockwashers.
2.	Using pliers, attach two drive pinions (4) to two shafts (5) with two retaining rings (6) (JPG).
3.	Using combination wrench, attach two guard plates (7) to gear box (2) with six screws (8) and six lockwashers (9). **NOTE** Follow-on Maintenance Action Required: Install gear box pump (para 20-52). Install pinlock (TM-20-2-3). Install anti-backlash mechanism (TM-20-2-3). Install traversing gear box (para 20-46).
	END OF TASK



20-64. UPPER HOUSING AND GEAR TRAIN DISASSEMBLY PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-68)

FRAME 1

Step	Procedure
1.	Remove intermediate gear (para 20-66).
2.	Remove differential (para 20-69).
3.	Disassemble differential (para 20-71).
4.	Remove lower backlash gear (para 20-73).
5.	Remove left gear shaft (para 20-75).
6.	Remove left pinion shaft (para 20-77).
7.	Remove right pinion shaft (para 20-79).
8.	Remove right gear shaft (para 20-81).
9.	Remove backlash gear shaft (para 20-83).
10.	Disassemble upper housing (para 20-85).
	END OF TASK

20-65. UPPER HOUSING AND GEAR TRAIN ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble upper housing (para 20-86).
2.	Install backlash gear shaft (para 20-84).
3.	Install right gear shaft (para 20-82).
4.	Install right pinion shaft (para 20-80).
5.	Install left pinion shaft (para 20-78).
6.	Install left gear shaft (para 20-76).
7.	Install lower backlash gear (para 20-74).
8.	Assemble differential (para 20-72).
9.	Install differential (para 20-70).
10.	Install intermediate gear (para 20-67).
	NOTE Follow-on Maintenance Action Required: Install upper housing and gear train (para 20-63).
	END OF TASK

20-66. INTERMEDIATE GEAR REMOVAL PROCEDURE

TOOLS: 8 ounce ball peen hammer
1/4" drift pin
External retaining ring pliers
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

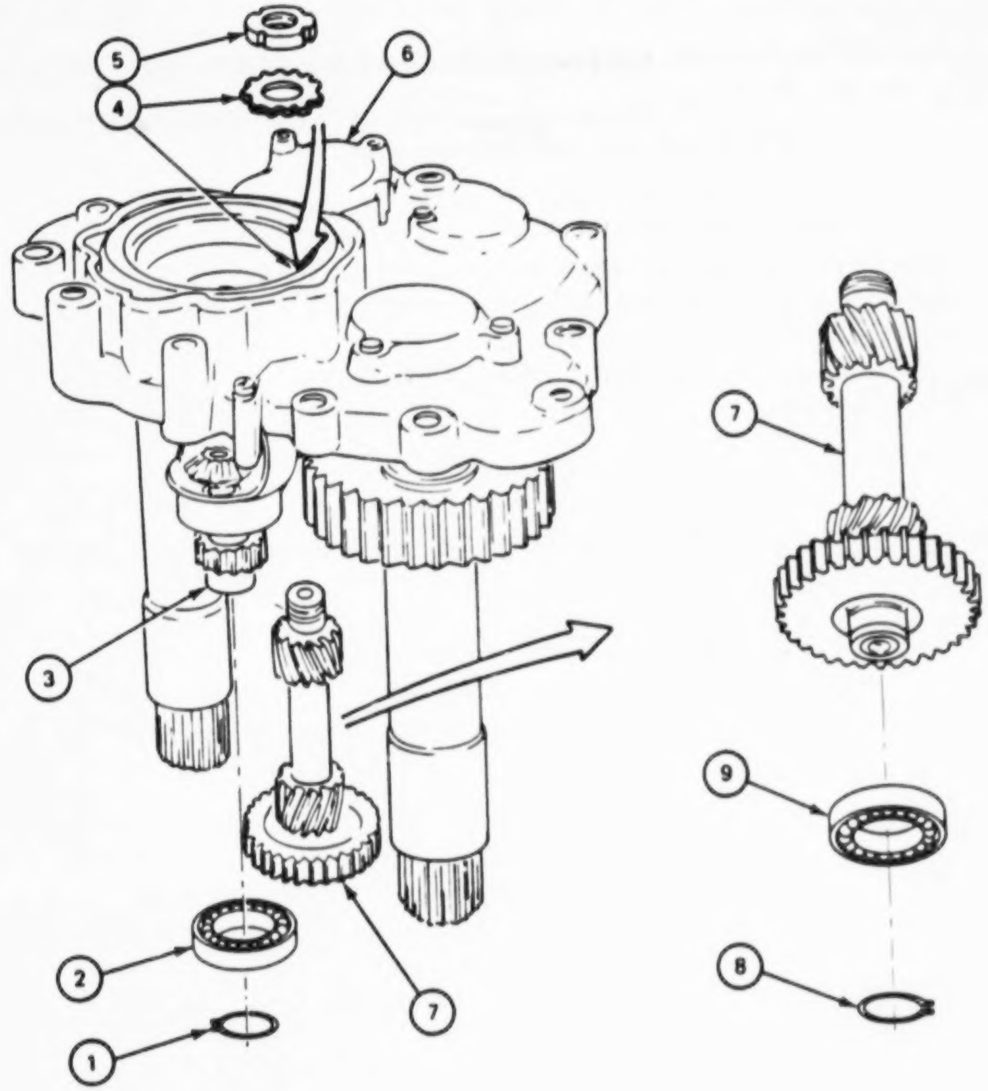
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62).

20-66. INTERMEDIATE GEAR REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using pliers, remove retaining ring (1) that attaches bearing (2) to differential gear (3). Remove bearing (JPG).
2.	Using hammer and drift pin, straighten washer (4) tangs from slots in nut (5). **NOTE** Pull on intermediate gear (7) as nut (5) is loosened, to provide clearance for nut.
3.	Using traversing gear tool kit in upper housing (6), loosen nut (5) to remove intermediate gear (7). Remove gear but do not remove nut (5) and washer (4) from upper housing (6).
4.	Using pliers, remove retaining ring (8) that attaches bearing (9) to intermediate gear (7). Remove bearing (JPG). **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61e). END OF TASK



20-67. INTERMEDIATE GEAR INSTALLATION PROCEDURE

TOOLS: 8 ounce ball peen hammer
1/4" drift pin
External retaining ring pliers
1/4" flat tip screwdriver
Traversing gear tool kit (12270518)

PERSONNEL: One

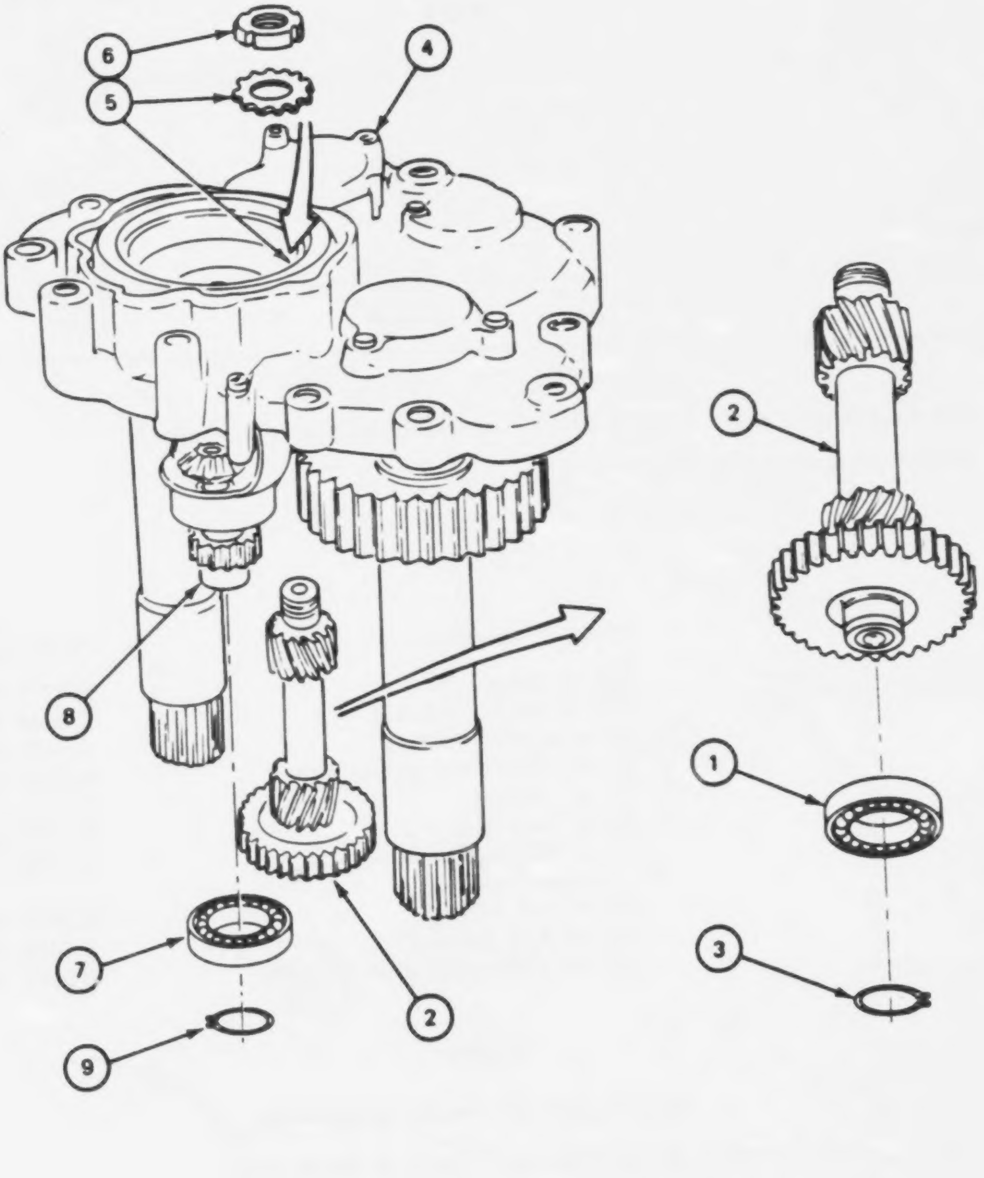
REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Install differential (para 20-71)
Inspect intermediate gear (para 20-61e)

20-67. INTERMEDIATE GEAR INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hands, put bearing (1) on intermediate gear (2).
2.	Using pliers, attach bearing (1) to intermediate gear with retaining ring (3) (JPG).
3.	Using hands, put intermediate gear (2) in upper housing (4). Mesh gears.
	NOTE Tang of lockwasher must be aligned to intermediate shaft to start nut in upper housing.
4.	Align tang of lockwasher (5) to intermediate gear (2) and using hands, start nut (6) on intermediate shaft (2) (parts in upper housing).
5.	Using traversing gear tool kit, attach intermediate gear (2) to upper housing (4) with nut (6) and washer (5), applying 25-30 foot-pounds of torque.
6.	Using screwdriver, bend washer (5) tangs to slot in nut (6).
7.	Using hands, put bearing (7) on differential gear (8).
8.	Using pliers, attach bearing (7) to differential gear (8) with retaining ring (9) (JPG).
	NOTE Follow-on Maintenance Action Required: Install upper housing and gear train (para 20-63).
	END OF TASK



20-68. DIFFERENTIAL INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble differential as required (para 20-71)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

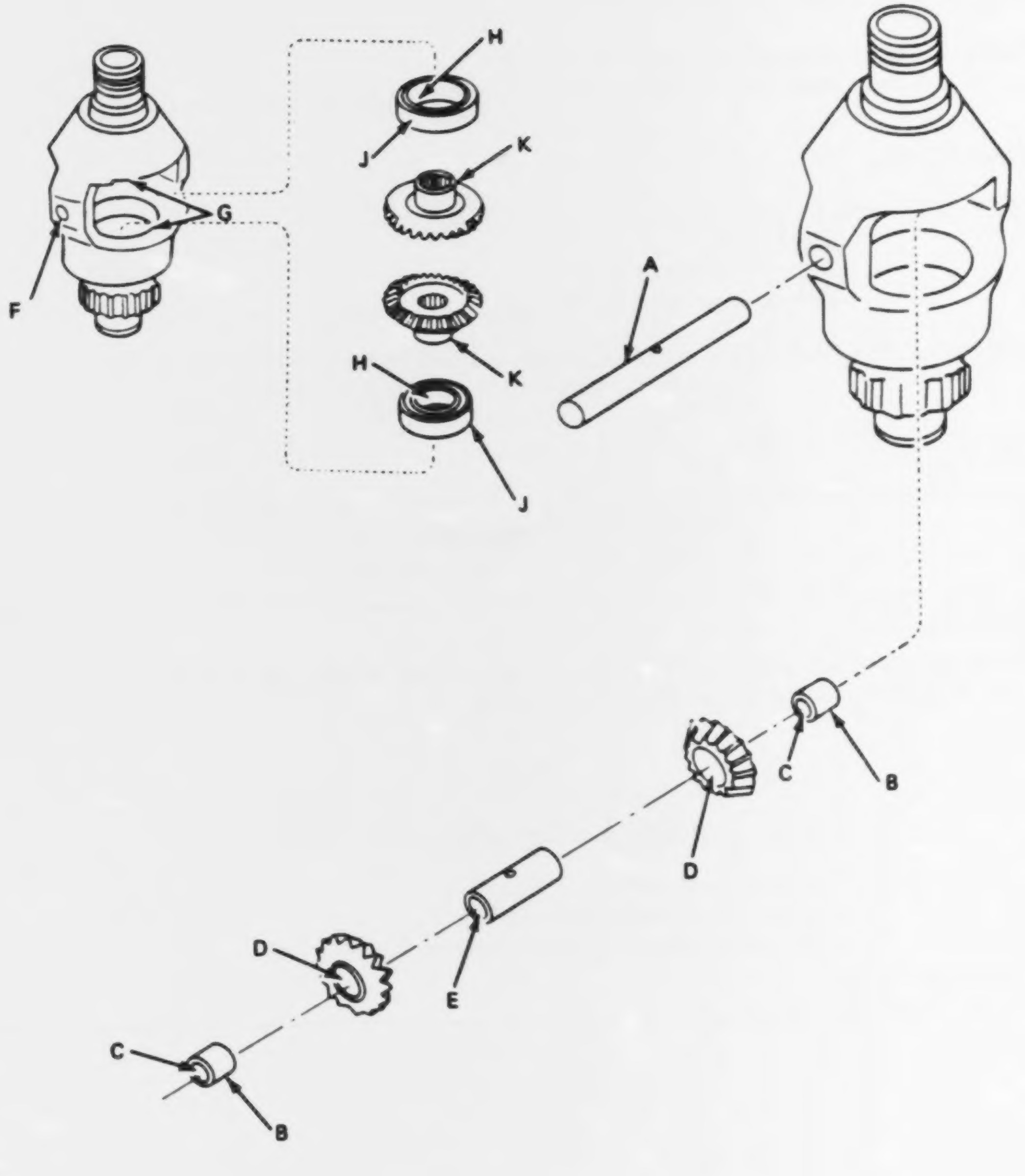
Step	Procedure
	SUPPORT SHOP WORK
1.	Take differential parts to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	OD of center pin	0.4373 to 0.4376
B	OD of needle bearing	0.6249 to 0.6251
C	ID of needle bearing	0.4373 to 0.4376
D	ID of differential pinion gear	0.6200 to 0.6203
E	ID of sleeve	0.438 to 0.443
F	ID of bore	0.4373 to 0.4378
G	ID of differential carrier counter bore	1.8503 to 1.8509
H	ID of ball bearing	0.9839 to 0.9843
J	OD of ball bearing	1.8499 to 1.8504
K	OD of differential gear shoulder	0.9842 to 0.9846

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return differential parts to turret shop.
	END OF TASK


H
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A
C
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D
D
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B

20-69. DIFFERENTIAL REMOVAL PROCEDURE

TOOLS: 8 ounce ball peen hammer
1/4" drift pin
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

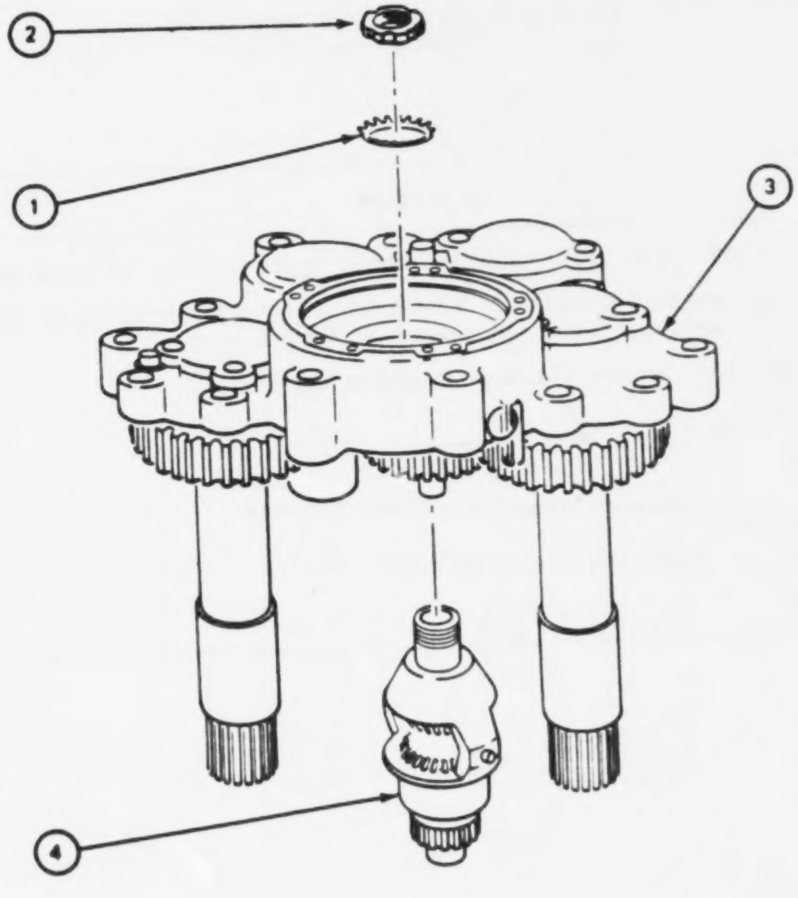
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)

FRAME 1

Step	Procedure
1.	Using hammer and drift pin, straighten washer (1) tangs from slots in nut (2) in upper housing (3).
2.	Using traversing gear tool kit, remove nut (2) and washer (1) that attach differential (4) to upper housing (3). Remove differential.
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61d).
	END OF TASK



20-70. DIFFERENTIAL INSTALLATION PROCEDURE

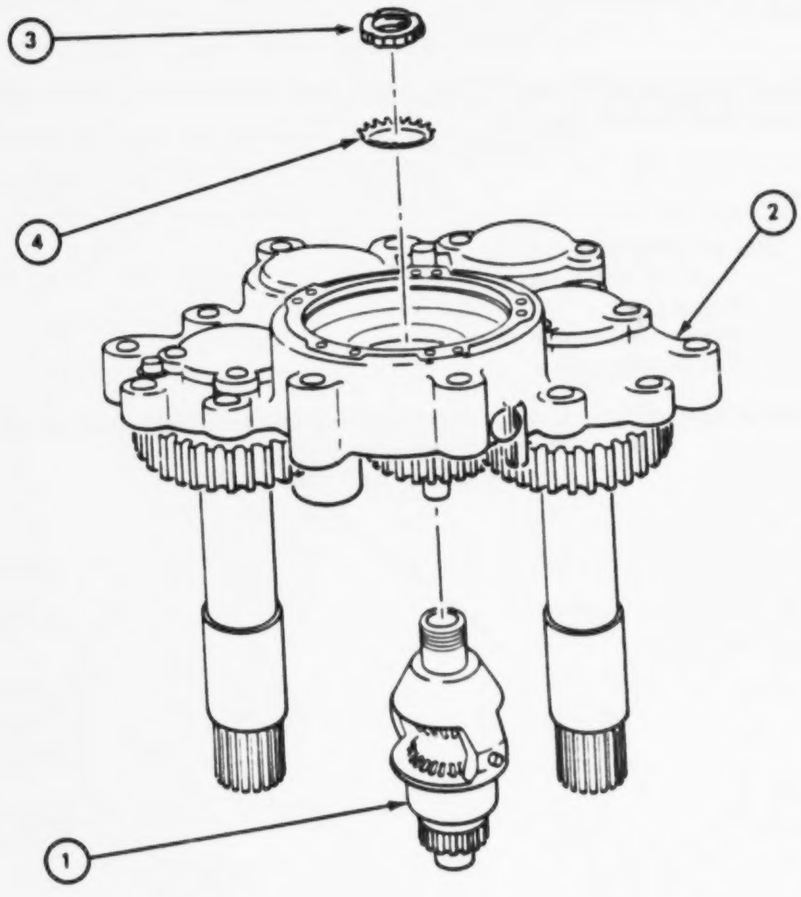
TOOLS: 8 ounce ball peen hammer
1/4" drift pin
1/4" flat tip screwdriver
Traversing gear tool kit (12270518)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install lower backlash gear (para 20-74)
Assemble differential (para 20-72)

FRAME 1

Step	Procedure
1.	Using hands, put differential (1) through bearing in upper housing (2). Mesh gears.
2.	Using traversing gear tool kit, attach differential (1) to upper housing (2) with nut (3) and washer (4), applying 25-50 foot-pounds of torque.
3.	Using screwdriver, bend washer (4) tangs to slot in nut (3). **NOTE** Follow-on Maintenance Action Required: Install intermediate gear (para 20-67). END OF TASK



20-71. DIFFERENTIAL DISASSEMBLY PROCEDURE

TOOLS: 1/4" flat tip screwdriver
Needle nose pliers
8 ounce ball peen hammer
1/4" drift pin
3/4" drift pin
Bearing puller
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

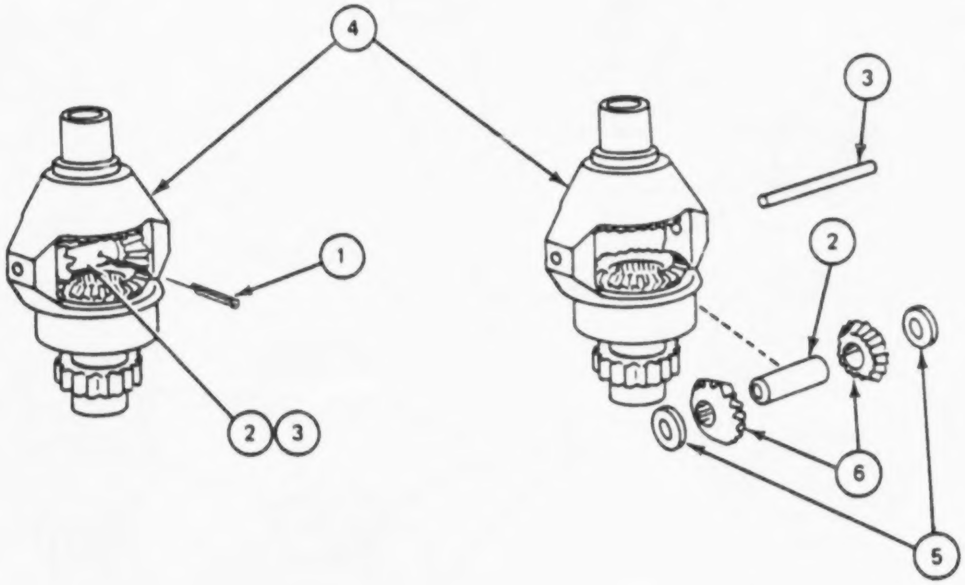
REFERENCES: JPG for procedures to:
Remove cotter pins
Clean parts
Inspect and repair parts
Use bearing puller

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)

20-71. DIFFERENTIAL DISASSEMBLY PROCEDURE (CONT)

FRAME 1

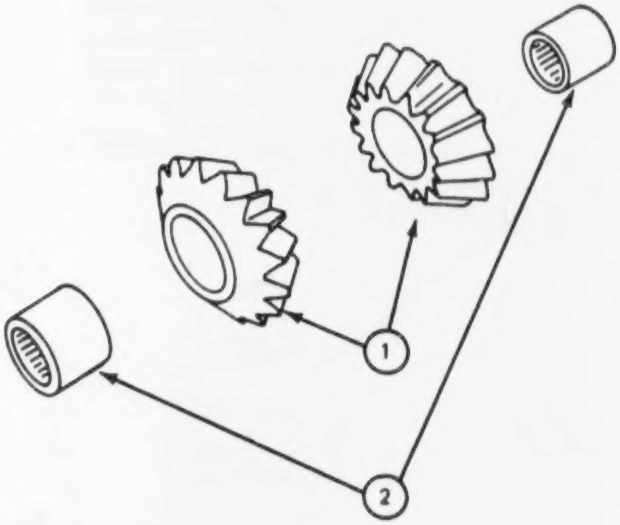
Step	Procedure
1.	Using pliers, straighten and remove cotter pin (1) from differential gear sleeve (2) and pin (3) of differential (4) (JPG).
2.	Using hammer and 1/4" drift pin, remove pin (3) from differential (4).
3.	Using hands, remove loose sleeve (2).
4.	Using screwdriver, remove two shim washers (5) from differential (4).
5.	Using hands, remove two gears (6) from differential (4).
	GO TO FRAME 2



20-71. DIFFERENTIAL DISASSEMBLY PROCEDURE (CONT)

FRAME 2

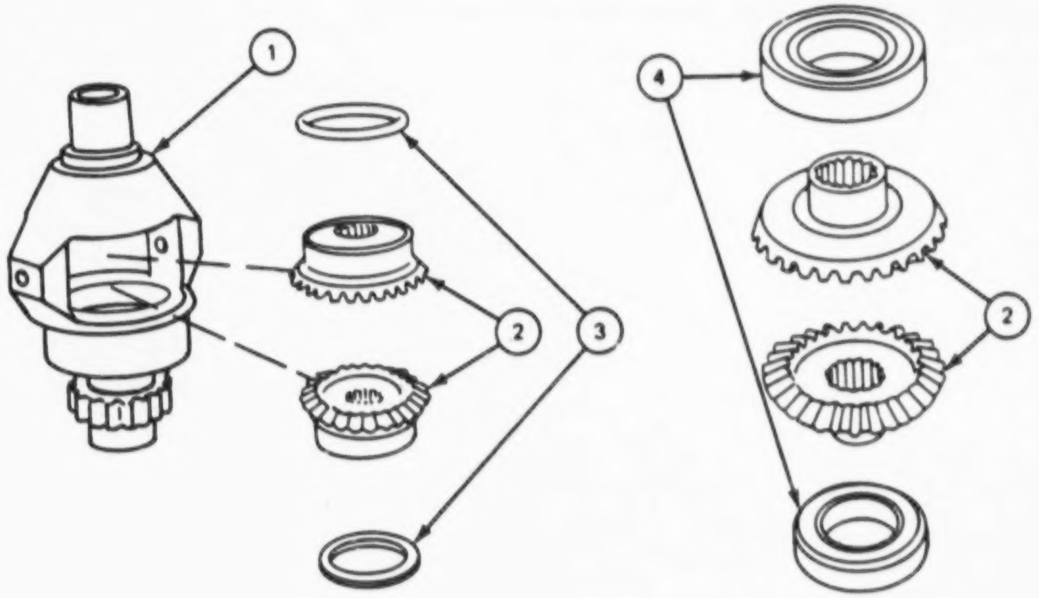
Step	Procedure
	SUPPORT SHOP WORK
1.	Take two gears (1) to support shop where press is available.
2.	Remove two needle bearings (2) from two gears (1).
3.	After support shop work, return parts of differential to turret shop.
	GO TO FRAME 3



20-71. DIFFERENTIAL DISASSEMBLY PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using hammer and 3/4" drift pin, work through each end of differential carrier (1) and tap two pinion gears (2) out of differential carrier (1).
2.	Using hands, remove two pinion gears (2) and shim washers (3) from differential carrier (1).
3.	Using bearing puller, remove two ball bearings (4) from two pinion gears (2) (JPG).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-68).
	END OF TASK



20-72. DIFFERENTIAL ASSEMBLY PROCEDURE

TOOLS:
- 3 ounce brass hammer
- 8 ounce ball peen hammer
- Needle nose pliers
- Feeler gauge
- 1/4'' drift pin

SUPPLIES:
- Cotter pin (MS 24665-283)
- Washer, 0.125 thk (7996769)
- Washer, 0.127 thk (8734860)
- Washer, 0.129 thk (8734858)
- Shim, 0.131 thk (8734859)
- Shim, 0.133 thk (8734857)
- Shim, 0.135 thk (7996768)
- Shim, 0.002 thk (8734856)
- Shim, 0.003 thk (7996771)
- Shim, 0.005 thk (8734861)
- Shim, 0.140 thk (8734862)
- Shim, 0.152 thk (8731863)
- Shim, 0.130 thk (8733976)
- Pencil
- Paper

PERSONNEL: One

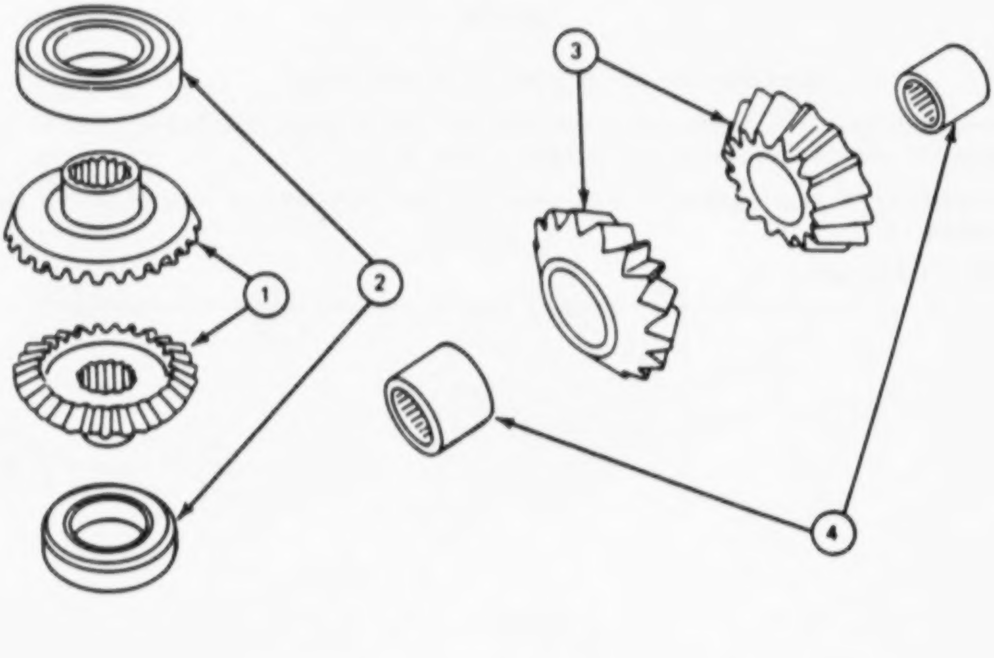
REFERENCES: JPG for procedure to install cotter pins

PRELIMINARY PROCEDURES: Inspect differential (para 20-68)

20-72. DIFFERENTIAL ASSEMBLY PROCEDURE (CONT)

FRAME 1

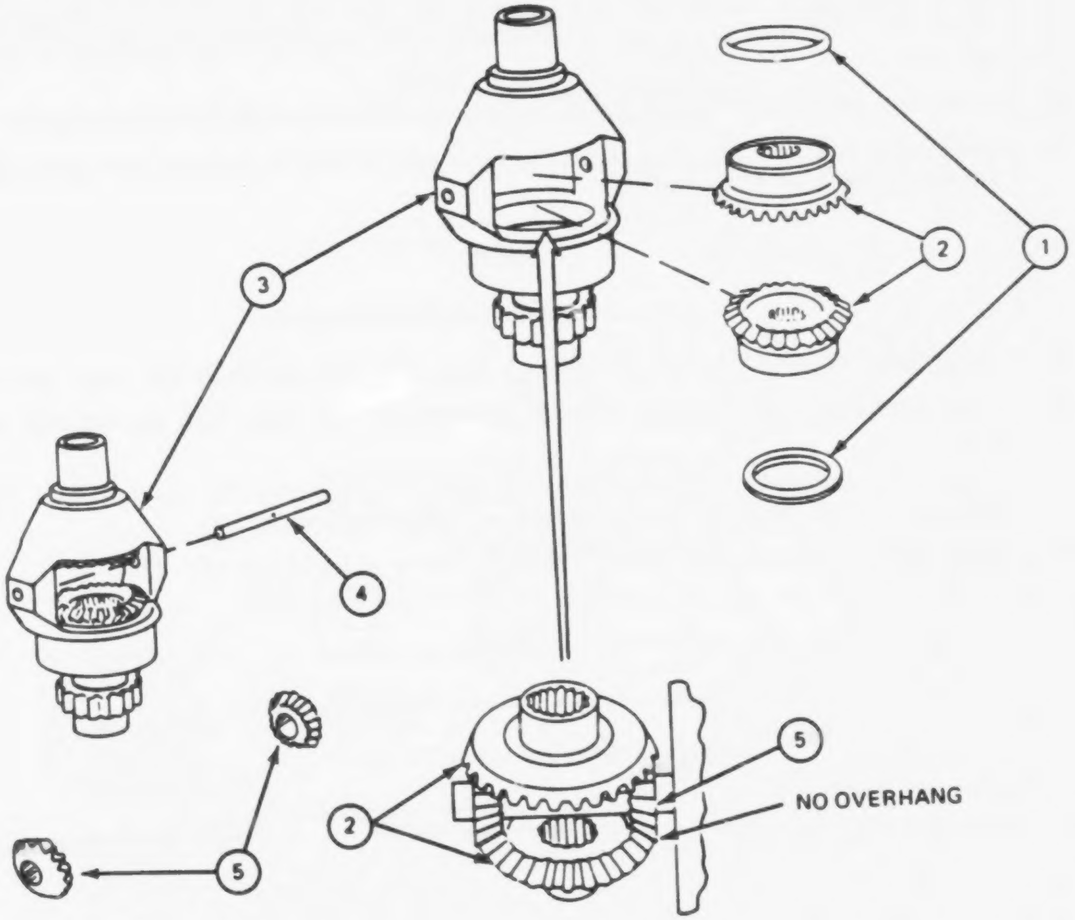
Step	Procedure
	SUPPORT SHOP WORK
1.	Take two pinion gears (1), two bearings (2), two gears (3) and two needle bearings (4) to shop where press is available. a. Install two bearings (2) on two pinion gears (1). b. Install two needle bearings (4) on two gears (3).
2.	After support shop work, return parts of differential to turret shop. GO TO FRAME 2



20-72. DIFFERENTIAL ASSEMBLY PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using hands, put two shim washers (1) and two pinion gears (2) in differential carrier (3). **NOTE** When installing pin (4) in differential carrier (3), make sure hole in pin is facing toward you.
2.	Using brass hammer, tap pin (4) part way in differential carrier (3) until it is flush with inner wall on one side.
3.	Using hands, put two gears (5) in differential carrier (3) while aligning them with pin (4). Hold two gears (5) in place.
4.	Using brass hammer, tap pin (4) through two gears (5) until pin (4) is flush with both outer surfaces of differential carrier (3). **NOTE** Make sure two pinion gears (2) are fully seated.
5.	Push both gears (5) together to mesh with two pinion gears (2). Pinion gears (2) and gears (5) should mesh with no overhand (View A).
6.	If overhang of pinion gears (2) and gears (5) is evident, add or remove size of shim washers (1). GO TO FRAME 3

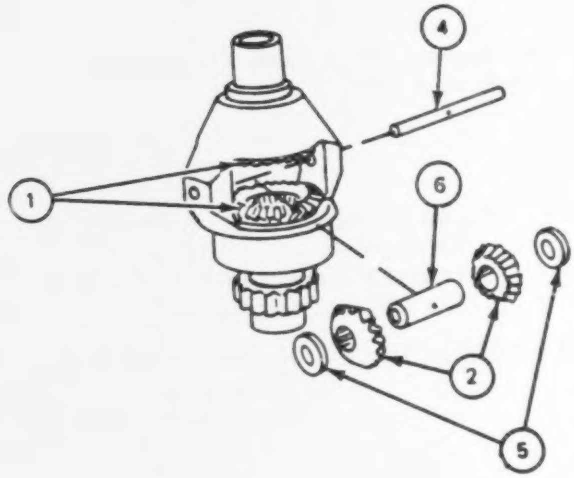

1
2
3
4
5
2
5
NO OVERHANG
2
5

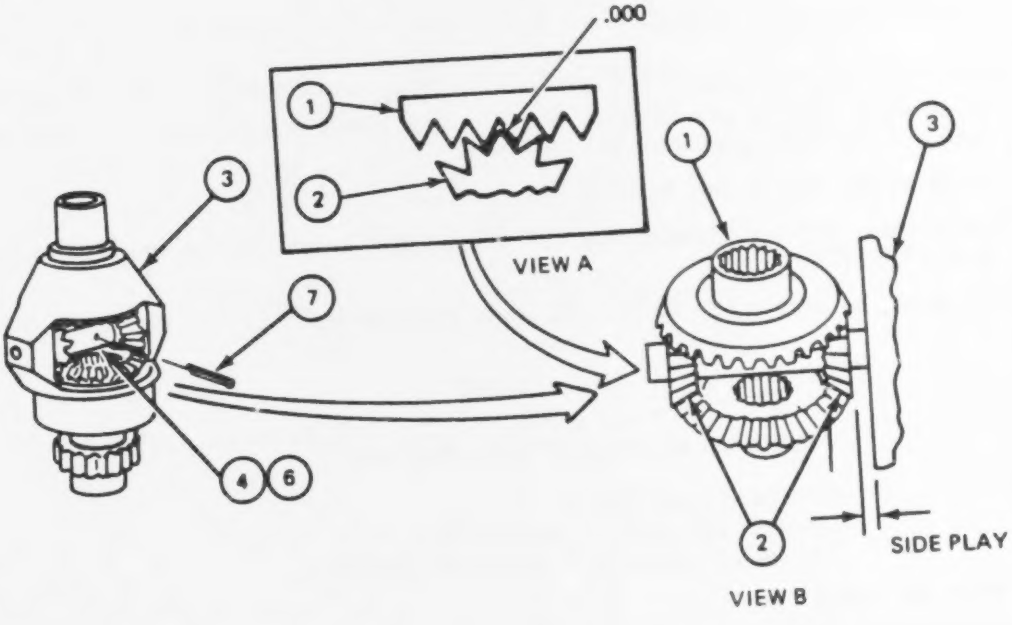
VIEW A

20-72. DIFFERENTIAL ASSEMBLY PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Check backlash between two pinion gears (1) and two gears (2). Backlash must be 0.000" (View A).
2.	Using feeler gauge, check side play between two gears (2) and differential housing (3) (View B). Using pencil and paper, write down side play measurement for right side and left side.
3.	Using ball peen hammer and punch, remove pin (4) from differential housing (3).
4.	Place right and left side shims (5) (size measured in step 2) between two gears (2) and differential housing (3).
	NOTE Make sure hole in pin (4) is facing you.
5.	Using brass hammer, tap pin (4) through right shim (5) and flush with right gear (2).
6.	Using hands, put sleeve (6) in differential carrier (3) and align with pin (4) and two gears (2).
7.	Using brass hammer, tap pin (4) through sleeve (6), left gear (2) and left shim (5), until pin is flush with both outer surfaces of differential carrier (3).
8.	Using pliers, put new cotter pin (7) through sleeve (6) and pin (4) (JPG).
	NOTE Follow-on Maintenance Action Required: Install differential (para 20-70).
	END OF TASK




.000
VIEW A
SIDE PLAY
VIEW B

20-73. LOWER BACKLASH GEAR REMOVAL PROCEDURE

TOOLS: External retaining ring pliers
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

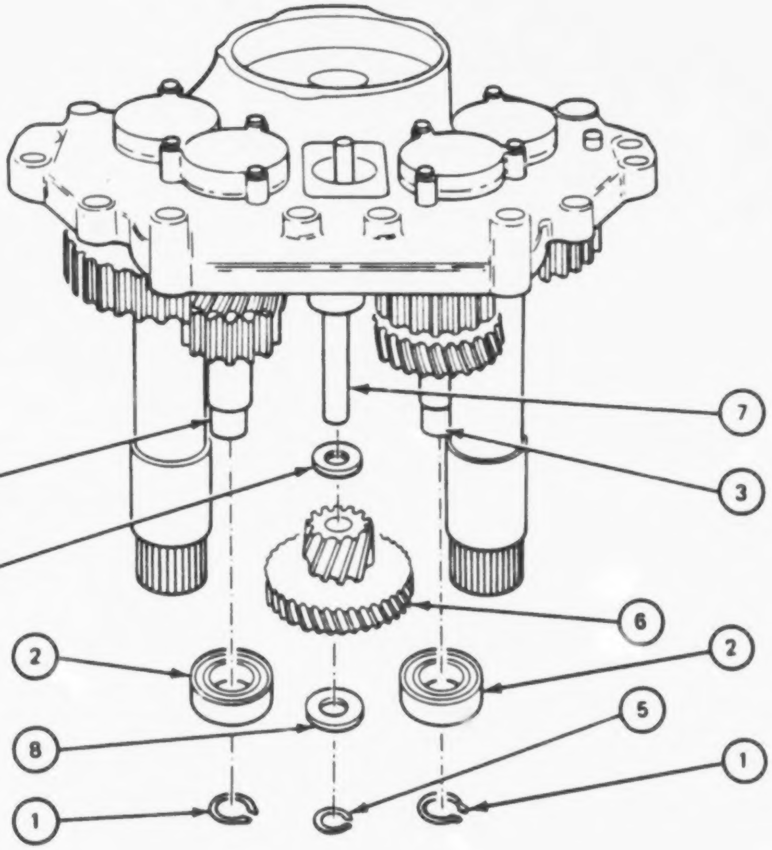
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)

FRAME 1

Step	Procedure
1.	Using pliers, remove two retaining rings (1) that attach two bearings (2) to the left gear shaft (3) and right gear shaft (4) (JPG).
2.	Using hands, remove two bearings (2).
3.	Using pliers, remove retaining ring (5) that attaches lower backlash gear (6) to backlash shaft (7) (JPG).
4.	Using hands, remove flat washer (8), lower backlash gear (6), and flat washer (9).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61c).
	END OF TASK



20-74. LOWER BACKLASH GEAR INSTALLATION PROCEDURE

TOOLS: External retaining ring pliers

PERSONNEL: One

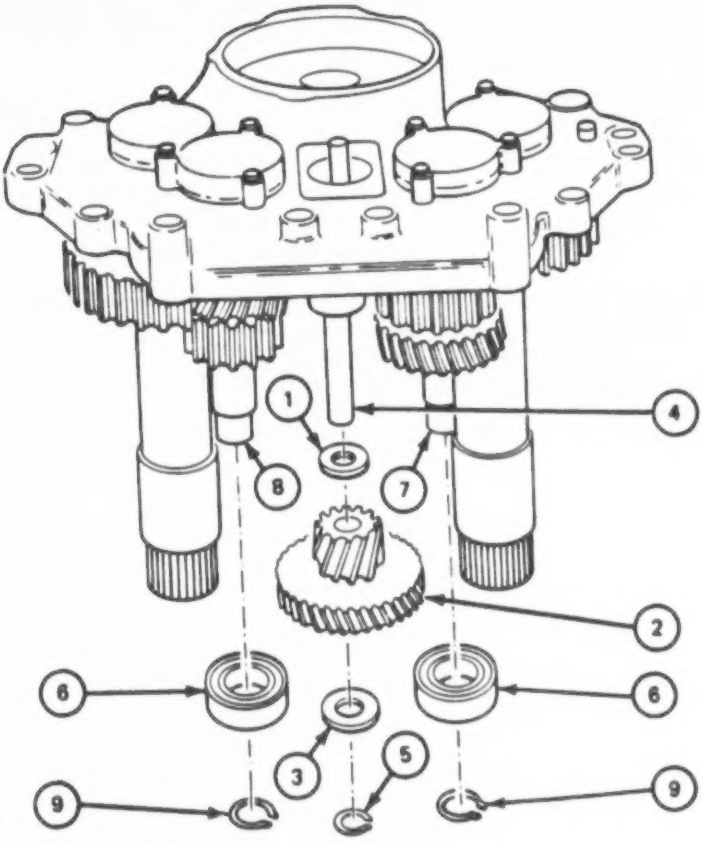
REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Install left gear shaft (para 20-76)
Inspect lower backlash gear (para 20-61c)

20-74. LOWER BACKLASH GEAR INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Washer (1) has curved surface and must be put in with flat side down.
1.	Using hands, put flat washer (1), lower backlash gear (2) and flat washer (3) on backlash shaft (4). Mesh gears.
2.	Using pliers, attach lower backlash gear (2) to backlash shaft (4) with retaining ring (5) (JPG).
3.	Using hands, put two bearings (6) on left gear shaft (7) and right gear shaft (8) (JPG).
4.	Using pliers, attach two bearings (6) to left gear shaft (7) and right gear shaft (8) with two retaining rings (9) (JPG).
	NOTE Follow-on Maintenance Action Required: Install differential (para 20-70).
	END OF TASK



20-75. LEFT GEAR SHAFT REMOVAL PROCEDURE

TOOLS: 7/16'' socket (3/8'' drive)
3/8'' drive ratchet
8 ounce ball peen hammer
1/4'' drift pin
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

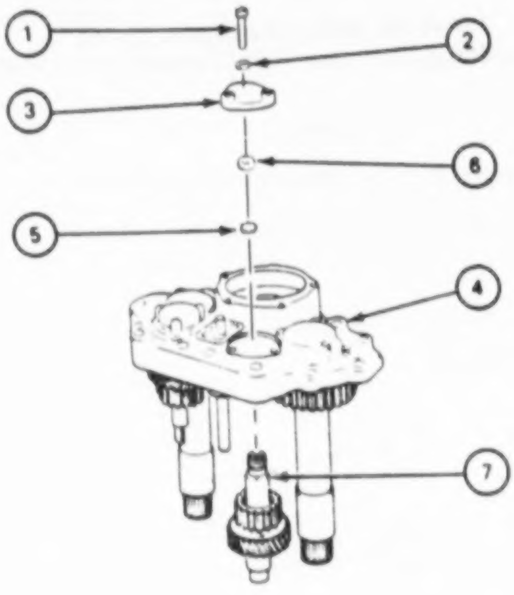
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)
Remove lower backlash gear (para 20-73)

20-75. LEFT GEAR SHAFT REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using 7/16" socket wrench, remove three screws (1) and three lockwashers (2) that attach left gear cover (3) to upper housing (4). **NOTE** Plastic face hammer may be needed to tap gear cover loose.
2.	Using hands, remove gear cover (3).
3.	Using ball peen hammer and drift pin, straighten washer (5) tangs from slots in nut (6) in upper housing (4). **NOTE** It may be necessary to hold gear shaft (7) with hands when removing nut (6).
4.	Using traversing gear tool kit, remove nut (6) and washer (5) that attach left gear shaft (7) to upper housing (4).
5.	Using hands, remove left gear shaft (7). **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61a).
	END OF TASK



20-76. LEFT GEAR SHAFT INSTALLATION PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
3/8" drive torque wrench (0 to 150 inch-pounds)
3/8" drive ratchet
Traversing gear tool kit (12270518)

PERSONNEL: One

REFERENCES: JPG for procedure to:
Use torque wrench
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Install left pinion shaft (para 20-78)
Inspect left gear shaft (20-61a)

20-76. LEFT GEAR SHAFT INSTALLATION PROCEDURE (CONT)

FRAME 1

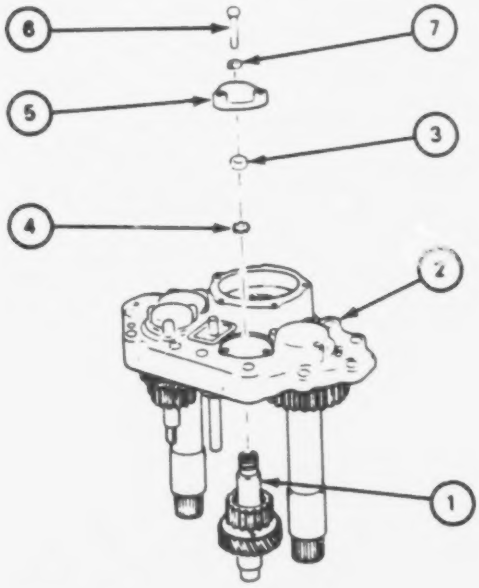
Step	Procedure
1.	Using hands, put left gear shaft (1) in upper housing (2) and mesh gears.
2.	Using traversing gear tool kit, attach left gear shaft (1) to upper housing (2) with nut (3) and washer (4), applying 25-50 foot-pounds of torque.
3.	Using hammer and drift pin, bend washer (4) tangs to slot in nut (3).
4.	Using socket wrench, attach left gear cover (5) to upper housing (2) with three screws (6) and three lockwashers (7).
5.	Using torque wrench, torque screws (6) to between 36 and 60 inch-pounds (JPG).

NOTE

Follow-on Maintenance Action Required:

Install lower backlash gear (para 20-74).

END OF TASK



20-77. LEFT PINION SHAFT REMOVAL PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
3/8" drive ratchet
8 ounce ball peen hammer
1/4" drift pin
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

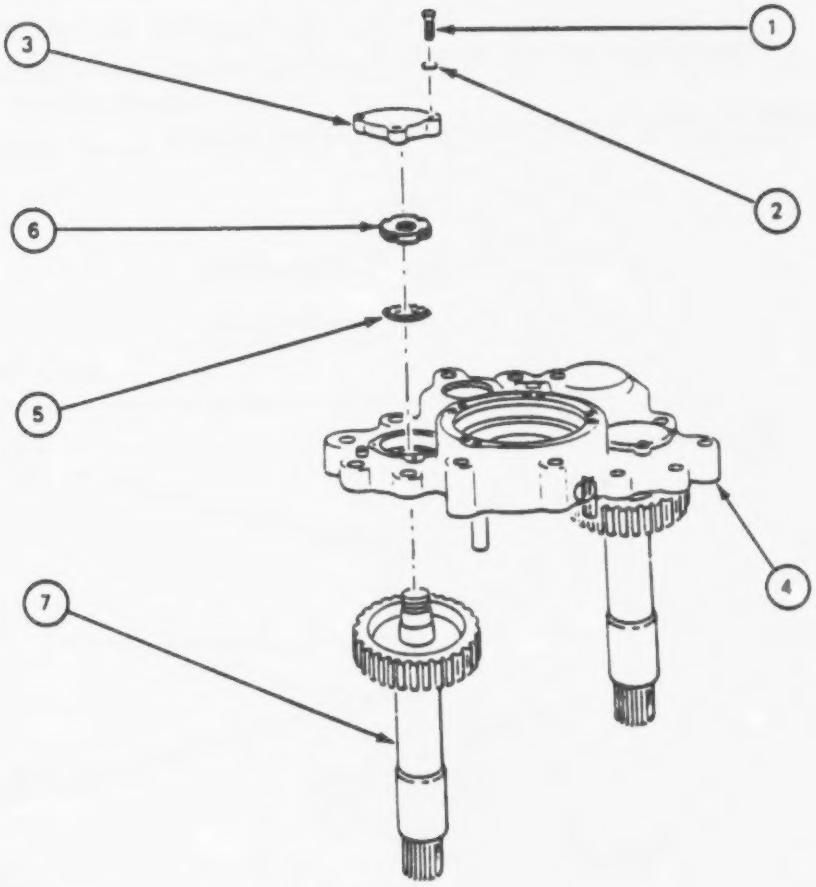
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Remove upper housing and gear shaft (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)
Remove lower backlash gear (para 20-73)
Remove left gear shaft (para 20-75)

20-77. LEFT PINION SHAFT REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using 7/16" socket wrench, remove three screws (1) and three lockwashers (2) that attach left pinion cover (3) to upper housing (4).
	NOTE Plastic face hammer may be needed to tap cover (3) loose.
2.	Using hands, remove gear cover (3).
3.	Using ball peen hammer and drift pin, straighten washer (5) tangs from slots in nut (6) in upper housing (4).
	NOTE It may be necessary to hold pinion shaft (7) with hands when removing nut (6).
4.	Using traversing gear tool kit, remove nut (6) and washer (5) that attach left pinion shaft (7) to upper housing (4).
5.	Using hands, remove left pinion shaft (7).
	NOTE Follow-on Maintenance Action Required: Clean all part (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61b)
	END OF TASK



20-78. LEFT PINION SHAFT INSTALLATION PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
3/8" drive torque wrench (0 to 150 inch-pounds)
3/8" drive ratchet
Traversing gear tool kit (12270518)

PERSONNEL: One

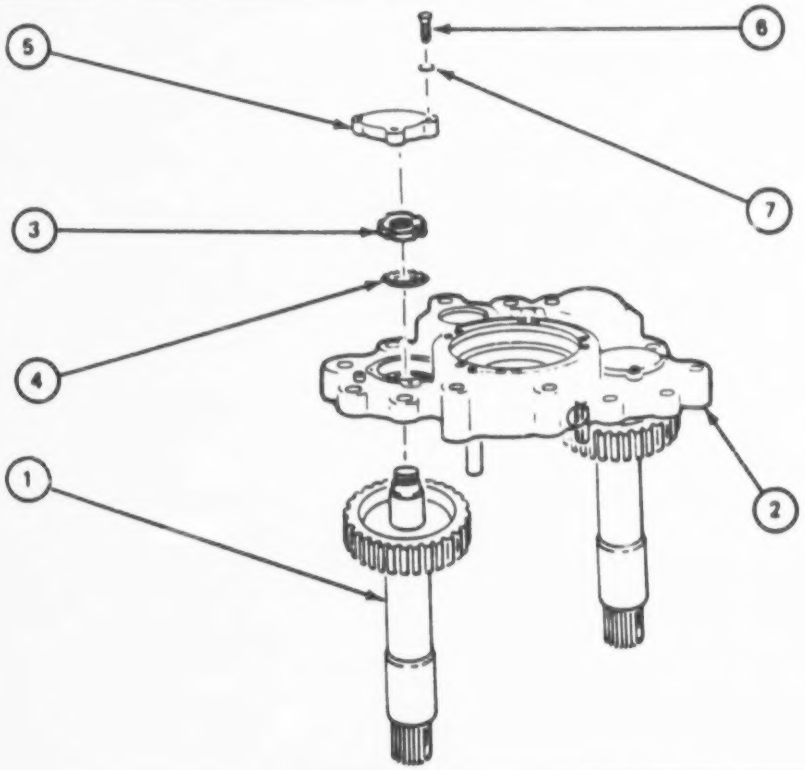
REFERENCES: JPG for procedure to:
Use torque wrench
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Inspect left pinion shaft (para 20-61b)

20-78. LEFT PINION SHAFT INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hands, put left pinion shaft (1) in upper housing (2) and mesh gears.
2.	Using traversing gear tool kit, attach left pinion shaft (1) to upper housing (2) with nut (3) and washer (4), applying between 25 and 50 foot-pounds of torque.
3.	Using hammer and drift pin, bend washer (4) tangs to slot in nut (3).
4.	Using socket wrench, attach left pinion cover (5) to upper housing (2) with three screws (6) and three lockwashers (7).
5.	Using torque wrench, torque screws (6) to between 36 and 60 inch-pounds (JPG).
	NOTE Follow-on Maintenance Action Required: Install left gear shaft (para 20-76).
	END OF TASK



Para 20-78 Cont

20-79. RIGHT PINION SHAFT REMOVAL PROCEDURE

TOOLS: 3/8" drive ratchet
7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

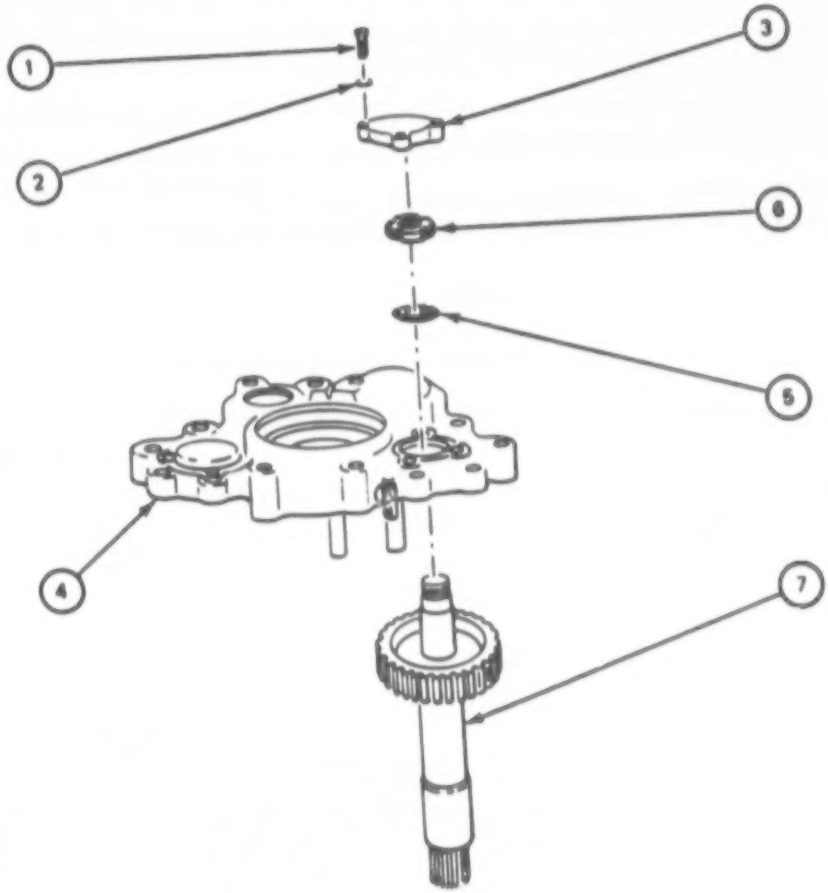
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Upper housing and gear train removed (para 20-62)

20-79. RIGHT PINION SHAFT REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using 7/16" socket wrench, remove three screws (1) and three lockwashers (2) that attach right pinion cover (3) to upper housing (4).
	NOTE Plastic face hammer may be needed to tap cover (3) loose.
2.	Using hands, remove gear cover (3).
3.	Using ball peen hammer and drift pin, straighten washer (5) tangs from slots in nut (6) in upper housing (4).
	NOTE It may be necessary to hold shaft (7) with hand when removing nut (6).
4.	Using traversing gear tool kit, remove nut (6) and washer (5) that attach right pinion shaft (7) to upper housing (4).
5.	Using hands, remove right pinion shaft (7).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61b).
	END OF TASK



20-80. RIGHT PINION SHAFT INSTALLATION PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
3/8" drive torque wrench (0 to 150 inch-pounds)
3/8" drive ratchet
Traversing gear tool kit (12270518)

PERSONNEL: One

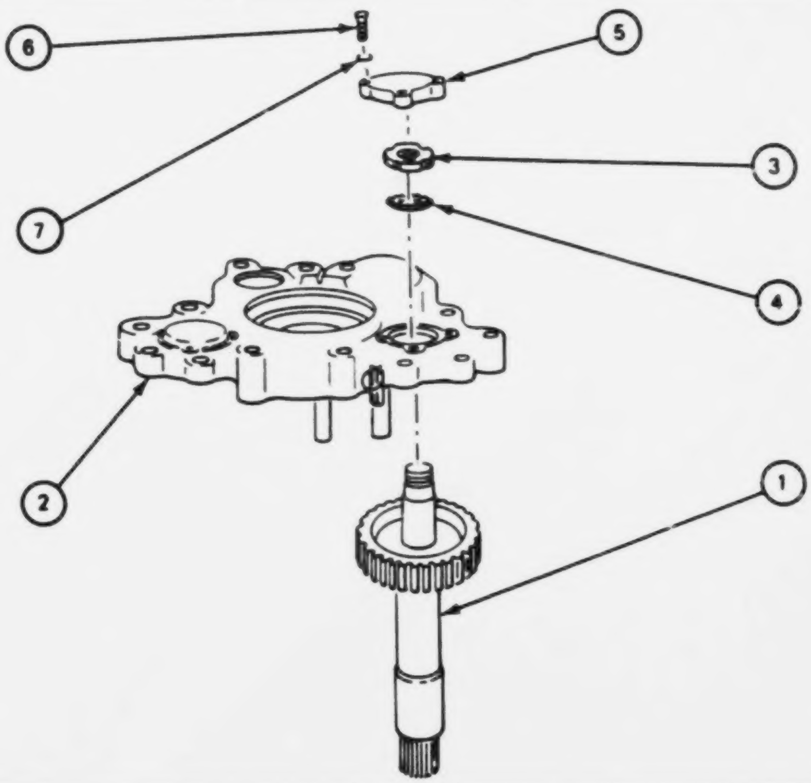
REFERENCES: JPG for procedure to:
Use torque wrench
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Install right gear shaft (para 20-82)
Inspect right pinion shaft (para 20-61b)

20-80. RIGHT PINION SHAFT INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hands, put right pinion shaft (1) in upper housing (2) and mesh gears.
2.	Using traversing gear tool kit, attach right pinion shaft (1) to upper housing (2) with nut (3) and washer (4), applying 25-50 foot-pounds of torque.
3.	Using hammer and drift pin, bend washer (4) tangs to slot in nut (3).
4.	Using socket wrench, attach right pinion cover (5) to upper housing (2) with three screws (6) and three lockwashers (7).
5.	Using torque wrench, torque screws (6) to between 36 and 60 inch-pounds (JPG).
	NOTE Follow-on Maintenance Action Required: Install upper housing and gear train (para 20-63).
	END OF TASK



Para 20-80 Cont

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20-81. RIGHT GEAR SHAFT REMOVAL PROCEDURE

TOOLS: 3/8" drive ratchet
7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
Scraper
Stiff bristled brush
Fine stone
Traversing gear tool kit (12270518)

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

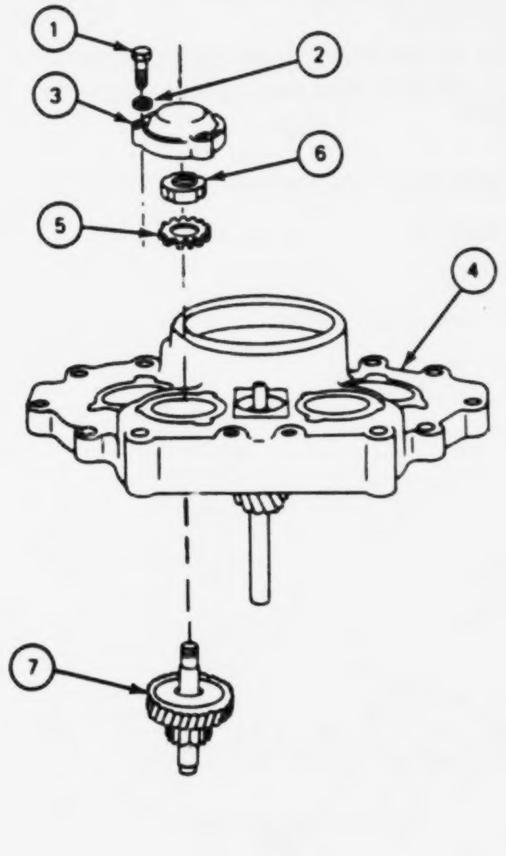
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove right pinion shaft (para 20-79)

20-81. RIGHT GEAR SHAFT REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using 7/16" socket wrench, remove three screws (1) and three lockwashers (2) that attach right gear cover (3) to upper housing (4). **NOTE** Plastic face hammer may be needed to tap cover (3) loose.
2.	Using hands, remove gear cover (3).
3.	Using ball peen hammer and drift pin, straighten washer (5) tangs from slots in nut (6) in upper housing (4). **NOTE** It may be necessary to hold shaft (7) with hand when removing nut (6).
4.	Using traversing gear tool kit, remove nut (6) and washer (5) that attach right gear shaft (7) to upper housing (4).
5.	Using hands, remove right gear shaft (7). **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of part (para 20-61d). END OF TASK



20-82. RIGHT GEAR SHAFT INSTALLATION PROCEDURE

TOOLS: 7/16" socket (3/8" drive)
8 ounce ball peen hammer
1/4" drift pin
3/8" drive torque wrench (0 to 150 inch-pounds)
3/8" drive ratchet
Traversing gear tool kit (12270518)

PERSONNEL: One

REFERENCES: JPG for procedure to:
Use torque wrench
Use tubular spanner wrench

PRELIMINARY PROCEDURES: Install backlash gear shaft (20-84)
Inspect right gear shaft (para 20-61a)

20-82. RIGHT GEAR SHAFT INSTALLATION PROCEDURE (CONT)

FRAME 1

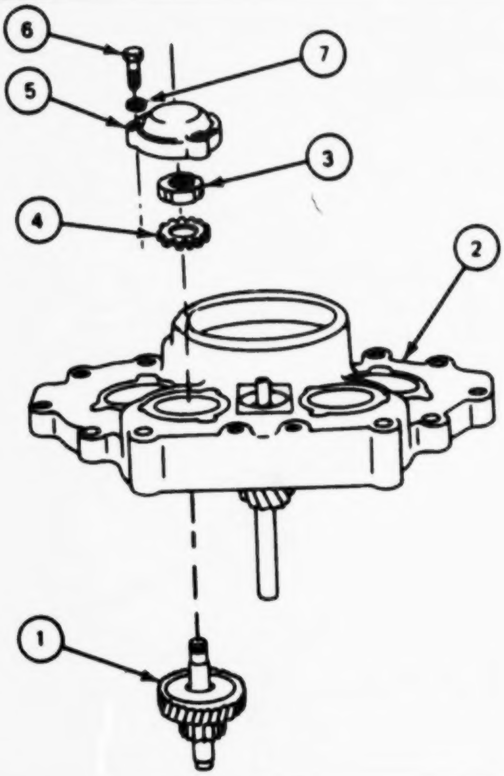
Step	Procedure
1.	Using hands, put right gear shaft (1) in upper housing (2) and mesh gears.
2.	Using traversing gear tool kit, attach right gear shaft (1) to upper housing (2) with nut (3) and washer (4), applying 25-50 foot-pounds of torque.
3.	Using hammer and drift pin, bend washer (4) tangs to slot in nut (3).
4.	Using socket wrench, attach right gear cover (5) to upper housing (2) with three screws (6) and three lockwashers (7).
5.	Using torque wrench, torque screws (6) to between 36 and 60 inch-pounds (JPG).

NOTE

Follow-on Maintenance Action Required:

Install right pinion shaft (para 20-80).

END OF TASK



Para 20-82 Cont

20-83. BACKLASH GEAR SHAFT OR UPPER HOUSING REMOVAL PROCEDURE

TOOLS: External retaining ring pliers
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

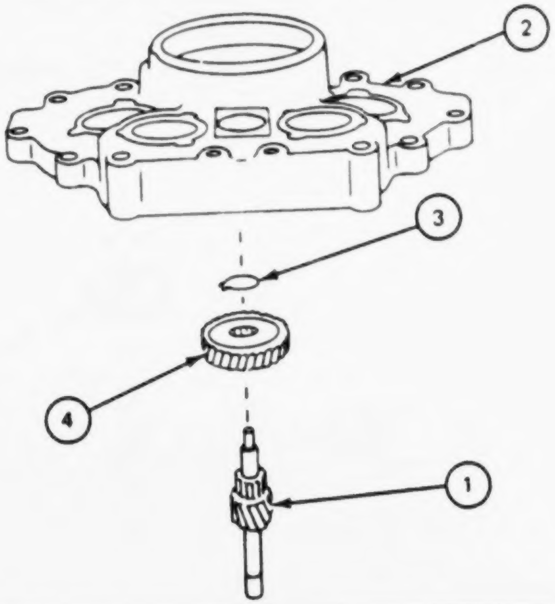
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)
Remove lower backlash gear (para 20-73)
Remove left gear shaft (para 20-75)
Remove left pinion gear (para 20-77)
Remove right pinion gear (para 20-79)
Remove right gear shaft (para 20-81)

20-83. BACKLASH GEAR SHAFT OR UPPER HOUSING REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hands, remove backlash gear shaft (1) from upper housing (2).
2.	Using pliers, remove retaining ring (3) that attaches backlash gear (4) to backlash gear shaft (1) (JPG).
	NOTE If gear (4) cannot be removed from shaft (1) in step 3, send parts to support shop where bearing press is available.
3.	Using hammer, remove gear (4) from shaft (1).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61c or 20-61f).
	END OF TASK



20-84. BACKLASH GEAR SHAFT OR UPPER HOUSING INSTALLATION PROCEDURE

TOOLS: External retaining ring pliers
Plastic face hammer

PERSONNEL: One

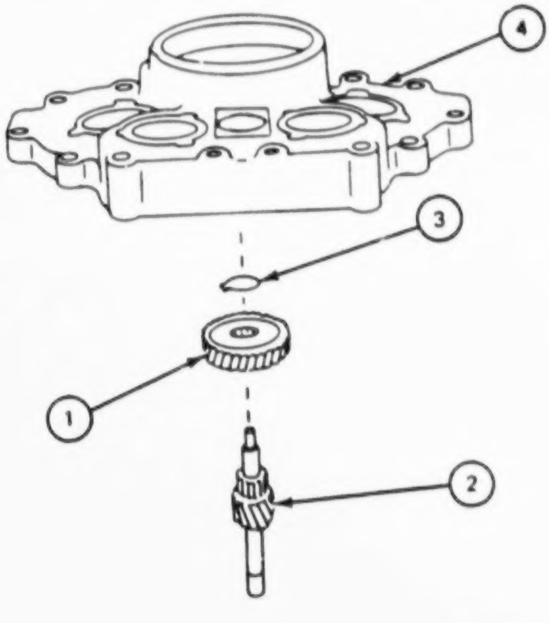
REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Inspect upper housing (para 20-61f)
Inspect backlash gear shaft (para 20-61c)
Assemble upper housing (para 20-86)

20-84. BACKLASH GEAR SHAFT OR UPPER HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE If backlash gear (1) cannot be put on backlash gear shaft (2) in step 1, send parts to support shop where bearing press is available.
1.	Using plastic face hammer, lightly tap backlash gear (1) on backlash gear shaft (2) with large bevel edge (angle) down.
2.	Using pliers, put retaining ring (3) on shaft (2) (JPG).
3.	Using hands, put backlash gear shaft (2) in upper housing (4).
	NOTE Follow-on Maintenance Action Required: Install right gear shaft (para 20-82). Install left pinion shaft (para 20-78)
	END OF TASK



20-85. UPPER HOUSING DISASSEMBLY PROCEDURE

TOOLS: 9/16" combination wrench
7/16" combination wrench
1/2" combination wrench
5/8" combination wrench
3/4" combination wrench
7/8" combination wrench
9/64" socket head screw key (Allen wrench)
Flat tip screwdriver
Internal retaining ring pliers
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

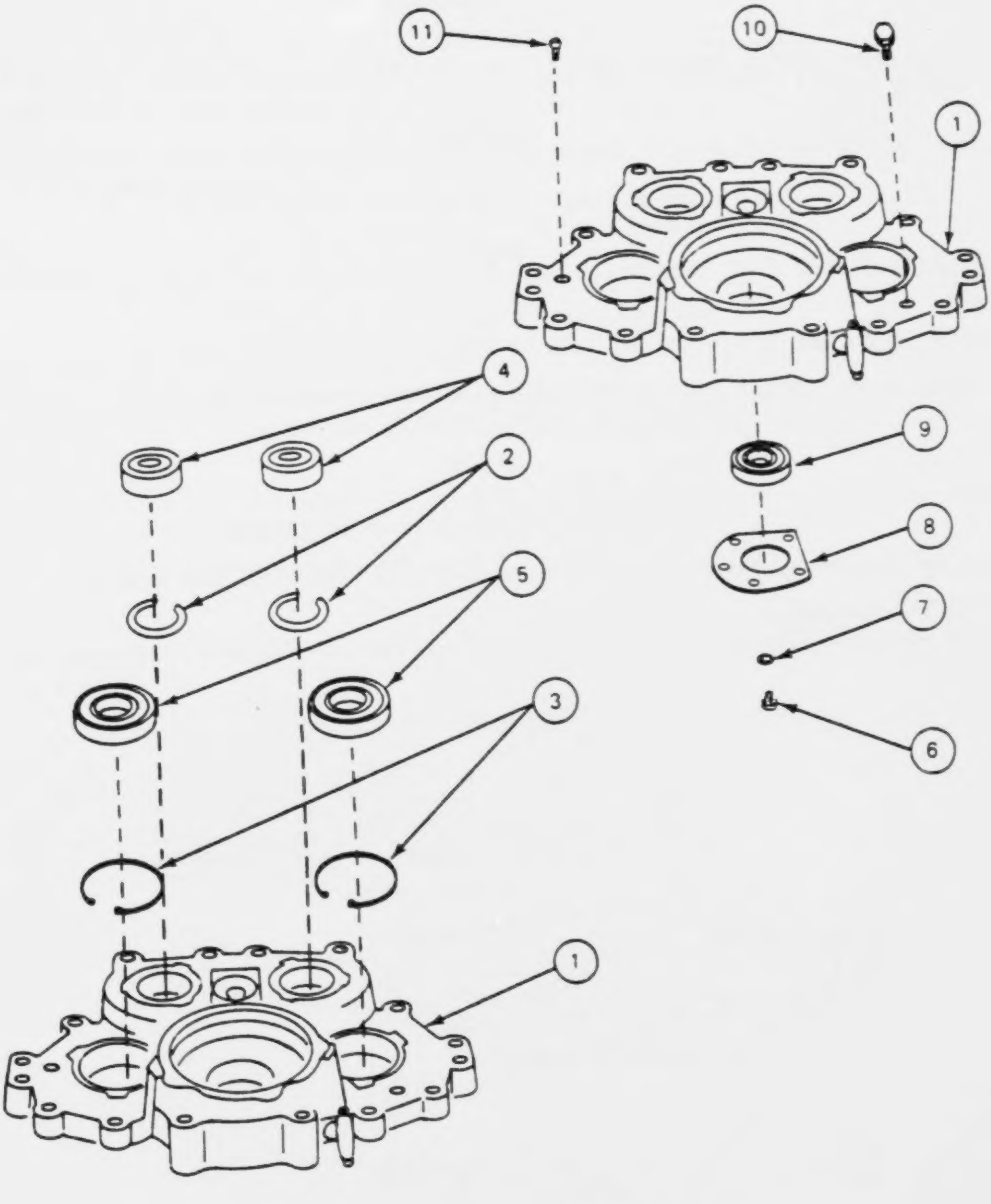
REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts
Use retaining ring pliers

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove intermediate gear (para 20-66)
Remove differential (para 20-69)
Remove lower backlash gear (para 20-73)
Remove left gear shaft (para 20-75)
Remove left pinion shaft (para 20-77)
Remove right pinion shaft (para 20-79)
Remove right gear shaft (para 20-81)
Remove backlash gear shaft (para 20-83)

20-85. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 1

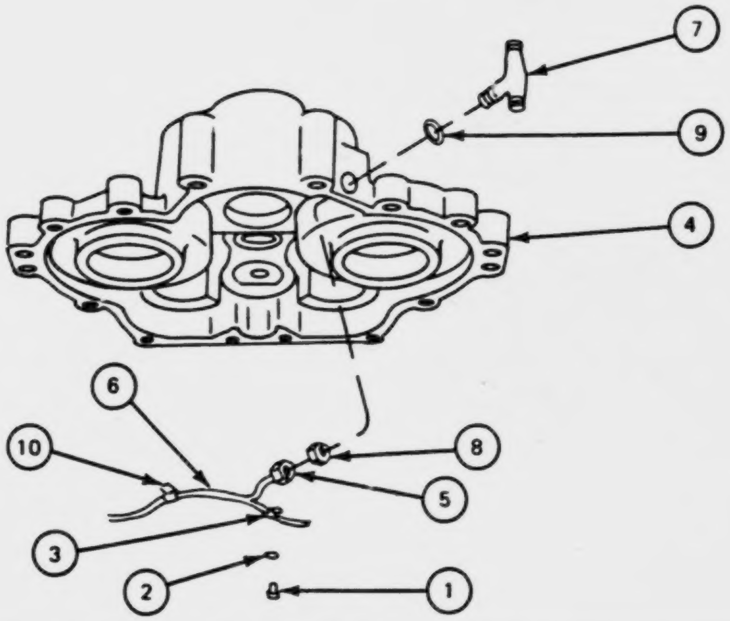
Step	Procedure
1.	Using hands, place upper housing (1) upside down to remove parts.
	CAUTION When removing retaining rings (2) and (3), bearings (4) and (5) may fall out.
2.	Using retaining ring pliers, remove two retaining rings (2) and push out two bearings (4) from upper housing (1) (JPG).
3.	Using retaining ring pliers, remove two retaining rings (3) and push out two bearings (5) from upper housing (1) (JPG).
4.	Using 7/16'' wrench, remove five screws (6) and five lockwashers (7) that attach differential bearing retaining plate (8) to upper housing (1).
5.	Using hands, remove retaining plate (8) and differential bearing (9).
6.	Using 7/8'' wrench, remove fill plug (10) from upper housing (1).
7.	Using 7/16'' wrench, remove vent plug (11) from upper housing (1).
	GO TO FRAME 2



20-85. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 2

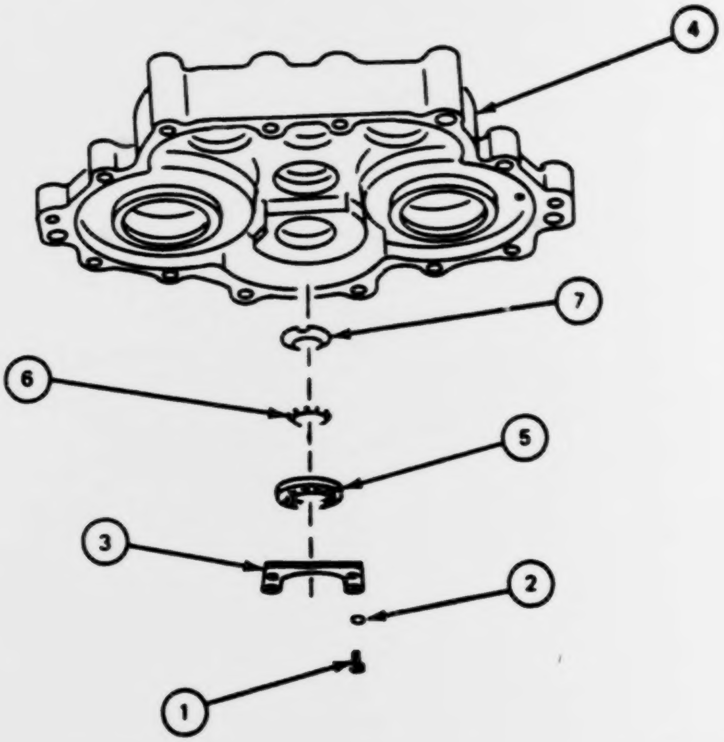
Step	Procedure
1.	Using Allen wrench, remove screw (1) and lockwasher (2) that hold clamp (3) to upper housing (4).
	NOTE Some upper housings (4) need 9/16" wrench for 1/2" wrench in steps 2 and 3.
2.	Using 1/2" and 5/8" wrenches, loosen nut (5) of oil tube (6) at tee (7). Remove tube (6).
3.	Using 1/2" and 3/4" wrenches, remove nut (8) from tee (7).
4.	Using hands, remove tee (7) and washer (9) from upper housing (4).
	NOTE Do step 5 only if tube (6) is to be replaced.
5.	Using screwdriver, pry open and remove clamps (3) and (10) from tube (6). GO TO FRAME 3



20-85. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using 7/16'' wrench, remove four screws (1) and four lockwashers (2) that attach intermediate bearing retaining plate (3) to upper housing (4).
2.	Using hands, remove retaining plate (3), intermediate bearing (5), washer (6), and nut (7) from upper housing (4). **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-61f). END OF TASK



20-86. UPPER HOUSING ASSEMBLY PROCEDURE

TOOLS: 7/16″ combination wrench
1/2″ combination wrench
9/16″ combination wrench
5/8″ combination wrench
3/4″ combination wrench
7/8″ combination wrench
3/8″ drive ratchet
7/16″ socket (3/8″ drive)
9/64″ socket head screw key (Allen wrench)
3/8″ drive torque wrench (0 to 150 inch-pounds)
Internal retaining ring pliers

SUPPLIES: Washer (7109405)

PERSONNEL: One

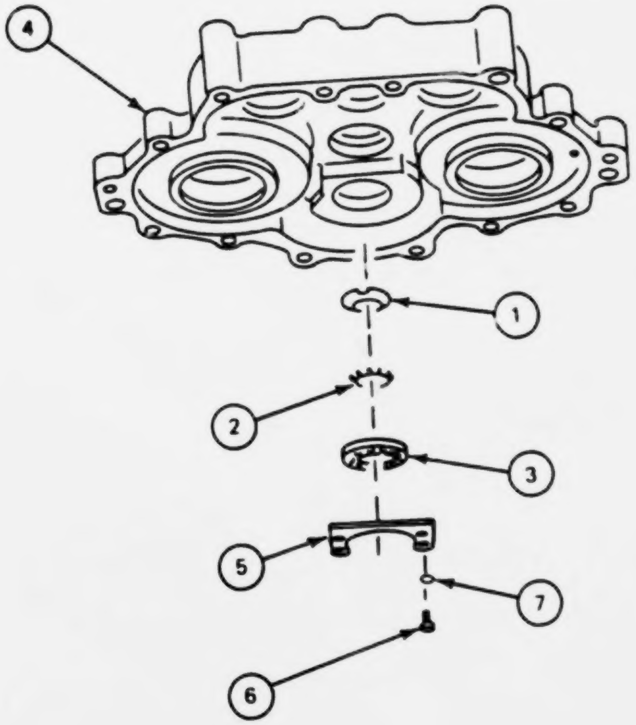
REFERENCES: JPG for procedures to:
Use retaining ring pliers
Use torque wrench

PRELIMINARY PROCEDURES: Inspect upper housing (para 20-61f)

20-86. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 1

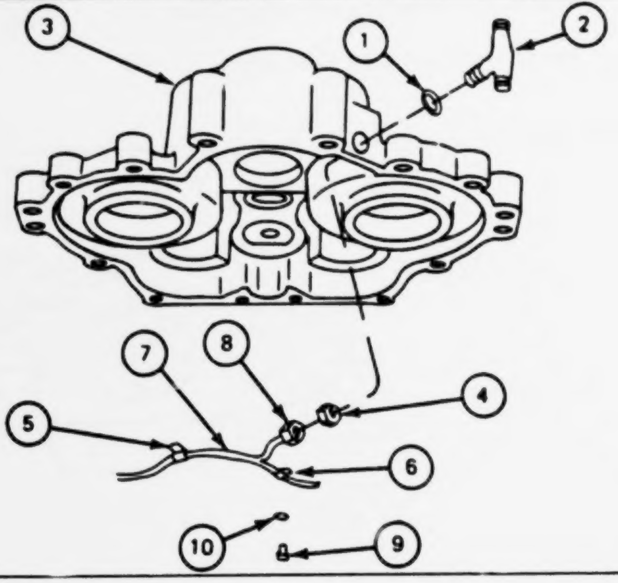
Step	Procedure
1.	Using hands, put nut (1), new washer (2), and intermediate bearing (3) with flat side toward housing, in upper housing (4).
2.	Using 7/16" socket wrench, attach intermediate bearing retaining plate (5) to upper housing (4) with four screws (6) and four lockwashers (7).
3.	Using torque wrench, torque four screws (6) to between 36 and 60 inch-pounds (JPG). GO TO FRAME 2



20-86. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 2

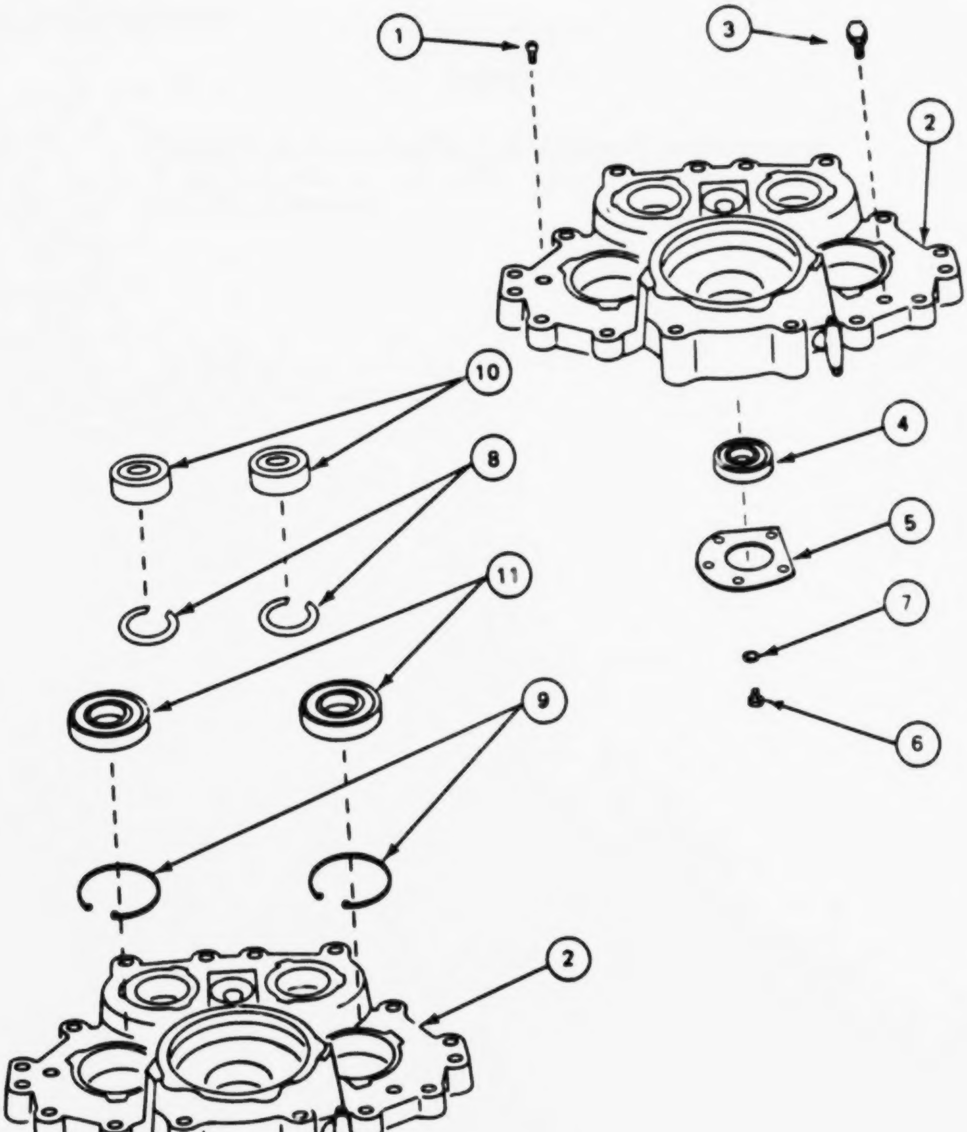
Step	Procedure
1.	Using hands, put washer (1) on tee (2) with bevel side of washer toward tee.
2.	Using hands, put tee (2) in upper housing (3) and attach nut (4) from inside upper housing.
	NOTE Some upper housings (3) need 9/16" wrench for 1/2" wrench.
3.	Using 1/2" and 3/4" wrenches, tighten nut (4) while holding tee (2) ports vertical to upper housing (3).
4.	Using hands, attach clamps (5) and (6) to tube (7), if tube is to be replaced.
	NOTE Some upper housings (3) need 9/16" wrench for 1/2" wrench.
5.	Using 1/2" and 5/8" wrenches, attach nut (8) of oil tube (7) to tee (2).
6.	Using Allen wrench, attach clamp (6) to upper housing (3) with screw (9) and lockwasher (10).
	GO TO FRAME 3



20-86. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using 7/16" wrench, attach vent plug (1) to upper housing (2).
2.	Using 7/8" wrench, attach fill plug (3) to upper housing (2).
3.	Using hands, put differential bearing (4) in upper housing (2). Put retaining plate (5) under clamp of oil tube in upper housing.
4.	Using 7/16" socket wrench, attach retaining plate (5) and clamp of oil tube to upper housing (2) with five screws (6) and five lockwashers (7).
5.	Using torque wrench, torque five screws (6) to between 36 and 60 inch-pounds (JPG).
	NOTE Bearings (10) and (11) can be installed in housing (2) from either side.
6.	Using pliers, put two retaining rings (8) in upper housing (2) (JPG).
7.	Using pliers, put two retaining rings (9) in upper housing (2) (JPG).
8.	Using hands, put two bearings (10) in upper housing (2).
9.	Using hands, put two bearings (11) in upper housing (2).
	NOTE Follow-on Maintenance Action Required: Install backlash gear shaft (para 20-84).
	END OF TASK



20-87. UPPER HOUSING REPAIR PROCEDURE

SUPPLIES: Bushing (12252650)
Adhesive/sealant (item 5, App. A)

PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect upper housing (para 20-61)

GENERAL INSTRUCTIONS:

NOTE

Procedure is used to replace bad bushing in upper housing. If upper housing is bad, order repair part or next higher assembly as required.

20-87. UPPER HOUSING REPAIR PROCEDURE (CONT)

FRAME 1

Step | **Procedure**

SUPPORT SHOP WORK

1. Take upper housing and new bushing to shop where press and inspection equipment are available.

a. Remove bad bushing.
b. Make dimensional check.

Reference Letter	Point of Measurement	Measurement
A	Housing bore for bushing	1.0000 to 1.0010
B	OD of new bushing	1.004 to 1.005

NOTE

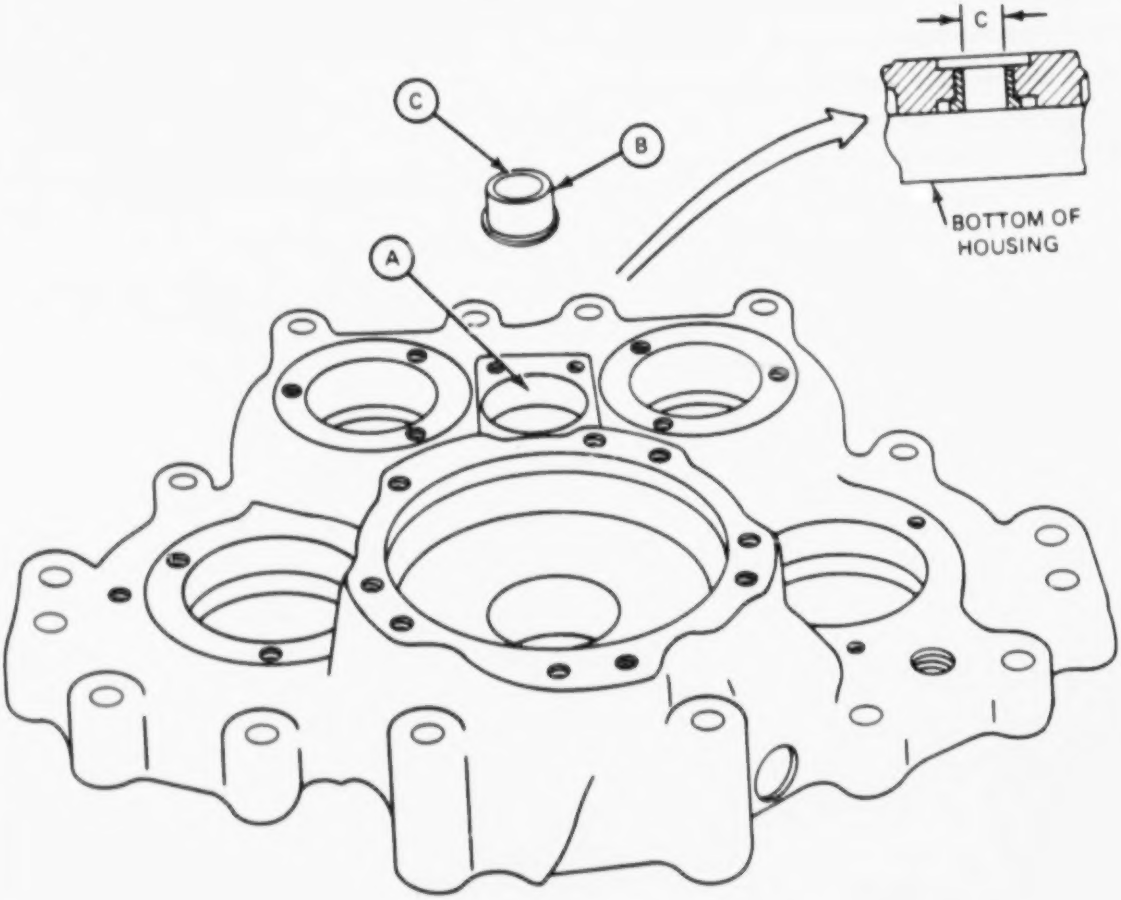
Deleted

c. Install new bushing.
d. Deleted

Reference Letter	Point of Measurement	Measurement
C	ID of bushing	0.751 to 0.755

2. After support shop work, return upper housing to turret shop.

END OF TASK


C
B
A
C
BOTTOM OF HOUSING

20-88. LOWER HOUSING GROUP DISASSEMBLY PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove upper housing and gear trains (para 20-62)

FRAME 1

Step	Procedure
1.	Remove magnetic brake (para 20-92).
2.	Disassemble lower housing (para 20-95).
	END OF TASK

20-89. LOWER HOUSING GROUP ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble lower housing (para 20-96).
2.	Install magnetic brake (para 20-93).
	NOTE Follow-on Maintenance Action Required: Install upper housing and gear train (para 20-63).
	END OF TASK

20-90. MAGNETIC BRAKE INSPECTION PROCEDURE

TOOLS: Multimeter

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use multimeter

PRELIMINARY PROCEDURES: Remove magnetic brake (para 20-92)

GENERAL INSTRUCTIONS:

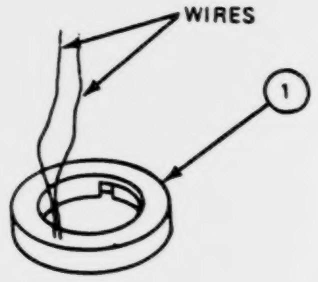
NOTE

If part is bad, order repair part or next higher assembly as required.

20-90. MAGNETIC BRAKE INSPECTION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using multimeter, check coil (1) wires for continuity of about 40 ohms (JPG). Replace bad part. GO TO FRAME 2



20-90. MAGNETIC BRAKE INSPECTION PROCEDURE (CONT)

FRAME 2

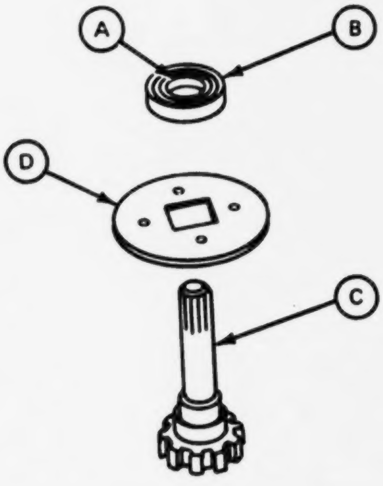
Step	Procedure
	SUPPORT SHOP WORK
1.	Take magnetic brake bearing, disk, and pinlock shaft to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	ID of bearing	1.1807 to 1.1811
B	OD of bearing	2.1649 to 2.1654
C	OD of pinlock shaft	1.1797 to 1.1802
D	Disk must be flat	

NOTE

Tag all parts that are out of tolerance.

Step	Procedure
3.	After support shop work, return magnetic brake bearing, disk, and pinlock shaft to turret shop.
	END OF TASK



20-91. MAGNETIC BRAKE TEST PROCEDURE

TEST EQUIPMENT: 24-28 vdc power source
Power source leads (two)
Magnetic brake torque wrench adapter (fabricated tool, item 7, App. B)

TOOLS: 3/4" socket (3/8" drive)
3/8" drive torque wrench (0-250 inch-pounds)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install magnetic brake (para 20-93)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, magnetic brake is bad. Replace bad magnetic brake (para 20-92).

Suitable fittings and tools should be used to connect test equipment to parts being tested.

20-91. MAGNETIC BRAKE TEST PROCEDURE (CONT)

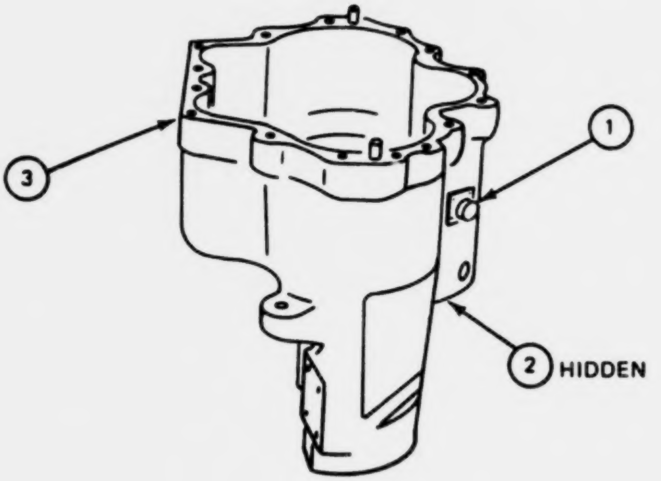
FRAME 1

Step	Procedure	Normal Indication	Probable Fault
1.	Connect positive lead of power source to magnetic brake connector (1) pin A. Connect negative lead to connector pin B.	. . .	. . .
2.	Turn power source on.	. . .	. . .
3.	Using torque wrench and adapter, apply between 160 and 170 inch-pounds to pinlock shaft (2) in lower housing (3).	Shaft does not move	Magnetic brake
4.	Remove torque wrench and adapter.	. . .	. . .
5.	Turn power source off.	. . .	. . .
6.	Disconnect power source leads.	. . .	. . .

NOTE

If normal indication ws obtained in steps 1 thru 6, magnetic brake is good.

END OF TASK



20-92. MAGNETIC BRAKE OR LOWER HOUSING REMOVAL PROCEDURE

TOOLS: Internal retaining ring pliers
External retaining ring pliers
Soldering iron
3/4" drift pin
1/4" flat tip screwdriver
9/64" socket head screw key (Allen wrench)
20 ounce ball peen hammer
3/4" combination wrench
7/8" combination wrench
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Lint-free cloth (item 21, App. A)
Pencil
Masking tape (item 36, App. A)
Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

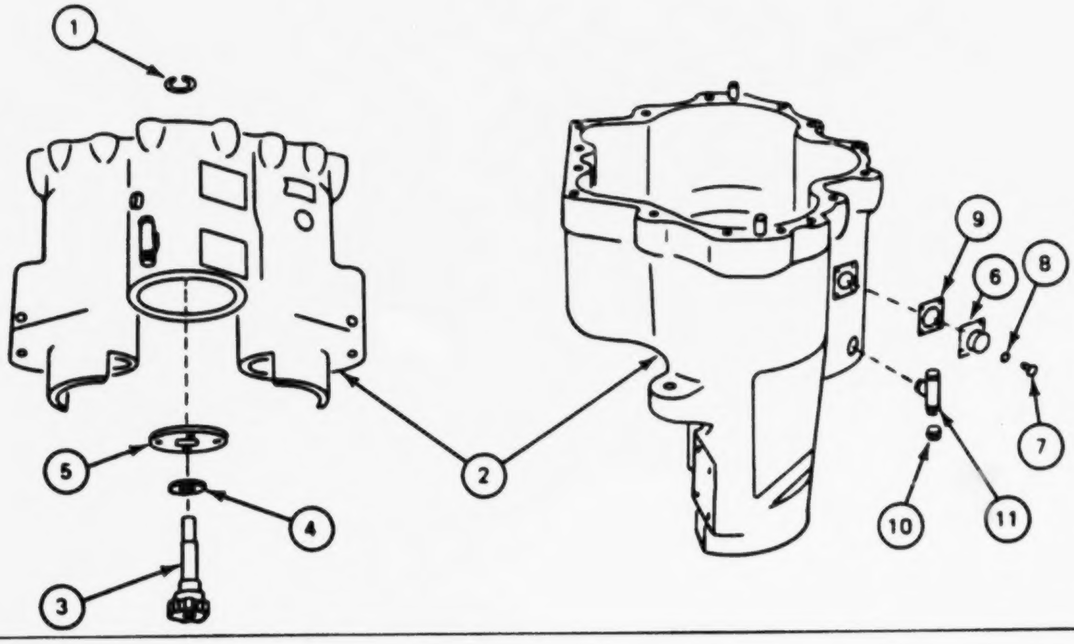
REFERENCES: JPG for procedures to:
Use soldering iron
Use retaining ring pliers
Clean parts
Inspect and repair parts
Tag wires

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-68)
Test magnetic brake (para 20-97)

20-92. MAGNETIC BRAKE OR LOWER HOUSING REMOVAL PROCEDURE (CONT)

FRAME 1

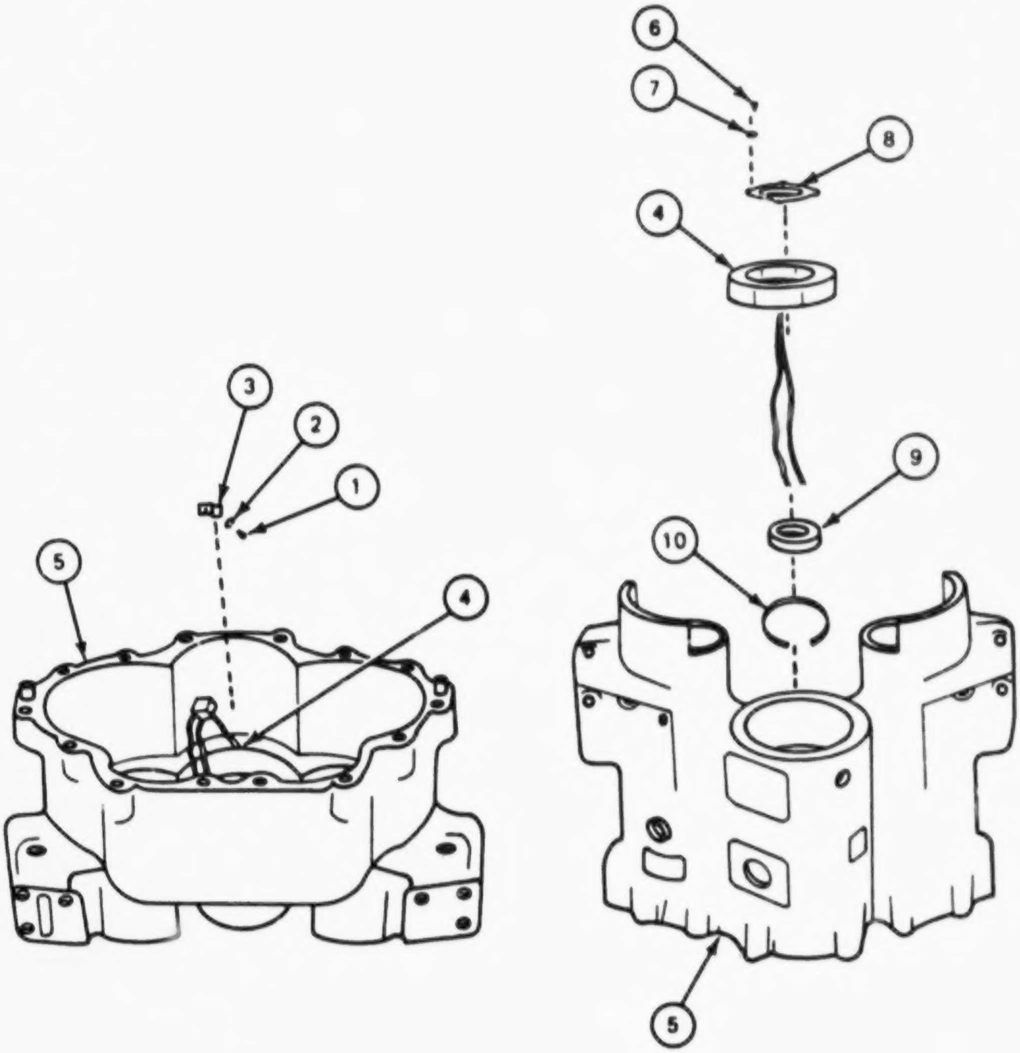
Step	Procedure
1.	Using external retaining ring pliers, remove retaining ring (1) (inside housing (2) that attaches pinlock shaft (3) to lower housing (2). Remove shaft (3), washer (4) and armature (5) (JPG).
2.	Using cloth and thinner, wipe area inside lower housing (2) around electrical connector (6).
3.	Using masking tape and pencil, tag each wire connected to terminals (JPG).
4.	Using screwdriver, remove four screws (7) and four lockwashers (8) that attach connector (6) to lower housing (2). Pull connector away from lower housing.
5.	Using soldering iron, unsolder two tagged wires from electrical connector (6) (JPG).
6.	Using hands, remove connector (6) and gasket (9).
7.	Remove gasket (9) from connector (6).
8.	Using 3/4'' wrench, remove plug (10) from tee (11).
9.	Using 7/8'' wrench, remove tee (11) from lower housing (2).
	GO TO FRAME 2



20-92. MAGNETIC BRAKE OR LOWER HOUSING REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using Allen wrench, remove screw (1), lockwasher (2), and clamp (3) that attach magnetic brake (4) electrical leads to lower housing (5).
2.	Using screwdriver, remove four screws (6) and four lockwashers (7) that attach magnetic brake retaining plate (8) to lower housing (5). Remove plate (8).
3.	Using hands, remove magnetic brake (4).
4.	Using drift pin and hammer, tightly tap bearing (9) from lower housing (5).
5.	Using internal retaining pliers, remove retaining ring (10) from lower housing (5) (JPG).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 20-94 or 20-90).
	END OF TASK



20-93. MAGNETIC BRAKE OR LOWER HOUSING INSTALLATION PROCEDURE

TOOLS: 7/8" combination wrench
20 ounce ball peen hammer
3/4" drift pin
Soldering iron
External retaining ring pliers
Internal retaining ring pliers
3/8" drive torque wrench (0 to 150 inch-pounds)
1/4" flat tip screwdriver (3/8" drive handle)
9/64" socket head screw key (Allen wrench)
3/16" flat tip screwdriver
Feeler gauge
3/4" combination wrench

SUPPLIES: Solder (item 31, App. A)
Gasket (MS 52000-4)

PERSONNEL: One

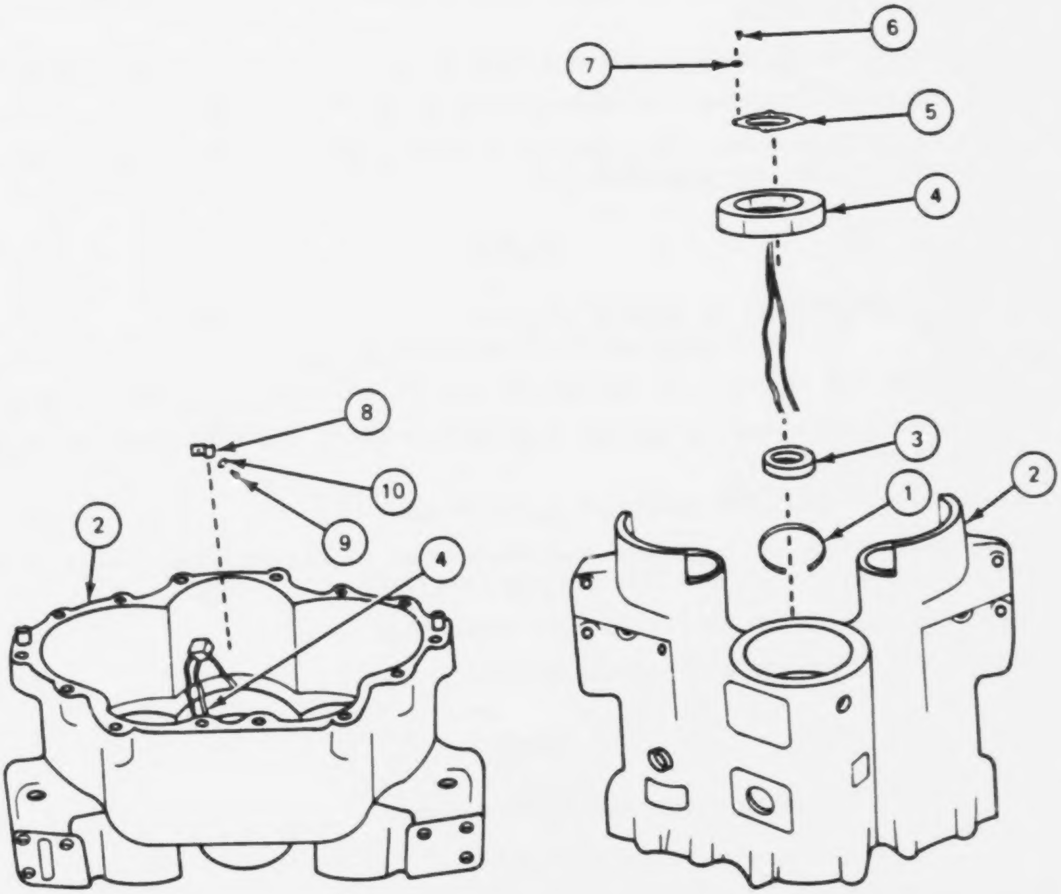
REFERENCES: JPG for procedures to:
Use soldering iron
Use retaining ring pliers

PRELIMINARY PROCEDURES: Assemble lower housing (para 20-96)
Inspect magnetic brake (para 20-90)

20-93. MAGNETIC BRAKE OR LOWER HOUSING INSTALLATION PROCEDURES (CONT)

FRAME 1

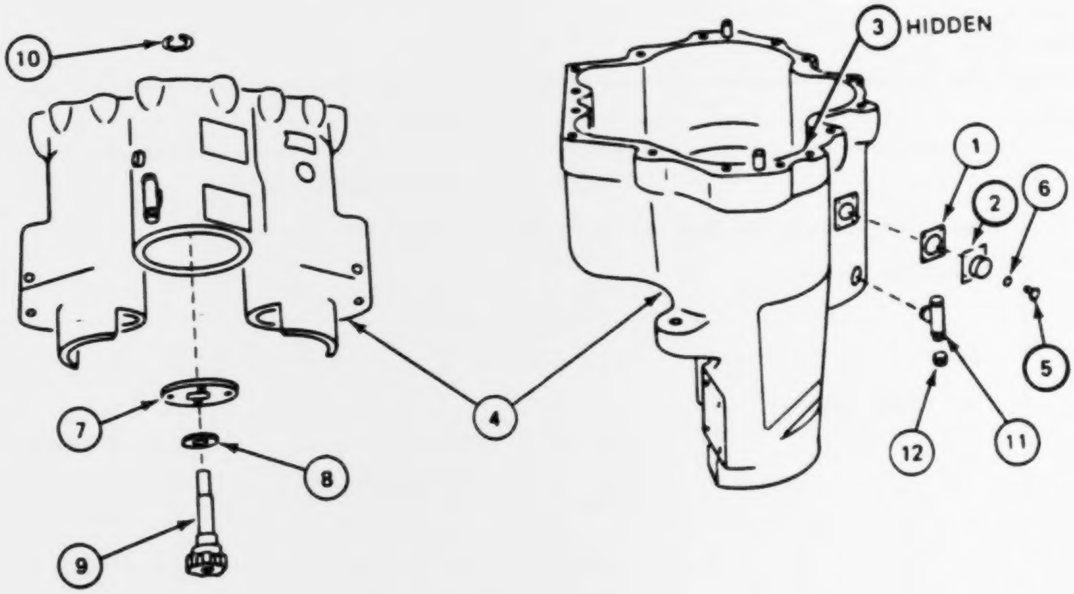
Step	Procedure
1.	Using internal retaining ring pliers, put retaining ring (1) in lower housing (2) (JPG).
2.	Using hammer and drift pin, lightly tap bearing (3) and magnetic brake (4) in lower housing (2).
3.	Using torque wrench and 1/4'' screwdriver handle, attach magnetic brake retaining plate (5) to lower housing (2) with four screws (6) and four lockwashers (7). Torque screws to between 22 and 24 inch-pounds.
4.	Using Allen wrench, attach magnetic brake (4) electrical leads to lower housing (2) with clamp (8), screw (9), and lockwasher (10). GO TO FRAME 2



20-93. MAGNETIC BRAKE OR LOWER HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using hands, put gasket (1) on connector (2).
2.	Using soldering iron, solder two tagged wires of magnetic brake (3) to proper terminals on connector (2) (JPG).
3.	Using hands, remove masking tape tags from two electrical wires of magnetic brake (3).
4.	Using hands, put insulation over soldered terminals of connector (2).
5.	Using flat tip screwdriver, attach connector (2) and gasket (1) to lower housing (4) with four screws (5) and four lockwashers (6).
	NOTE Washers are required (5 maximum) to obtain air gap between magnetic brake (3) and armature (7).
6.	Using hands, put armature (7), washers (8), and pin lock shaft (9) in lower housing (4).
7.	Using feeler gauge, check air gap to obtain between 0.020" and 0.040" between magnetic brake (3) and armature (7).
8.	Repeat steps 6 and 7 until proper air gap is obtained.
9.	Using external retaining ring pliers, from inside lower housing (4) attach pinlock shaft (9) to lower housing (4) with retaining ring (10) (JPG).
10.	Using 7/8" wrench, put tee (11) in lower housing (4).
11.	Using 7/4" wrench, put plug (12) on tee (11).
	NOTE Follow-on Maintenance Action Required: Test magnetic brake (para 20-91).
	END OF TASK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20-94. LOWER HOUSING INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble lower housing group (para 20-95)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1

Step	Procedure
	SUPPORT SHOP WORK
1.	Take lower housing to shop where inspection equipment is available.
2.	Dimensional check.

Reference Letter	Point of Measurement	Measurement
A	Housing bore for bearing	2.1659 to 2.1664
B	Housing bore for bearing (2 places)	2.0477 to 2.0482
C	Housing bore for bearing	2.0005 to 2.0010
D	ID of bushing (installed in housing)	0.7499 to 0.7509
E	ID of shaft bushing (installed in housing, two placed)	2.1250 to 2.1275

NOTE

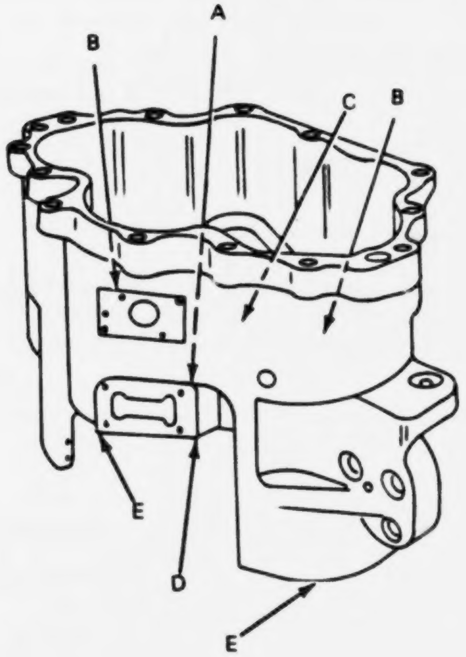
Tag all parts that are out of tolerance.

3. After support shop work, return lower housing to turret shop.

NOTE

If bushing measurements are out of tolerance, replace bushings (para 20-97).

END OF TASK


A
B
C
B
E
D
E

20-95. LOWER HOUSING DISASSEMBLY PROCEDURE

TOOLS: 7/16" combination wrench
1-1/8" combination wrench
3/16" socket head screw key (Allen wrench)
20 ounce ball peen hammer
1/4" drift pin
Slip joint pliers
Diagonal cutting pliers
Putty knife
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Remove upper housing and gear train (para 20-62)
Remove magnetic brake (para 20-92)

20-95. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 1

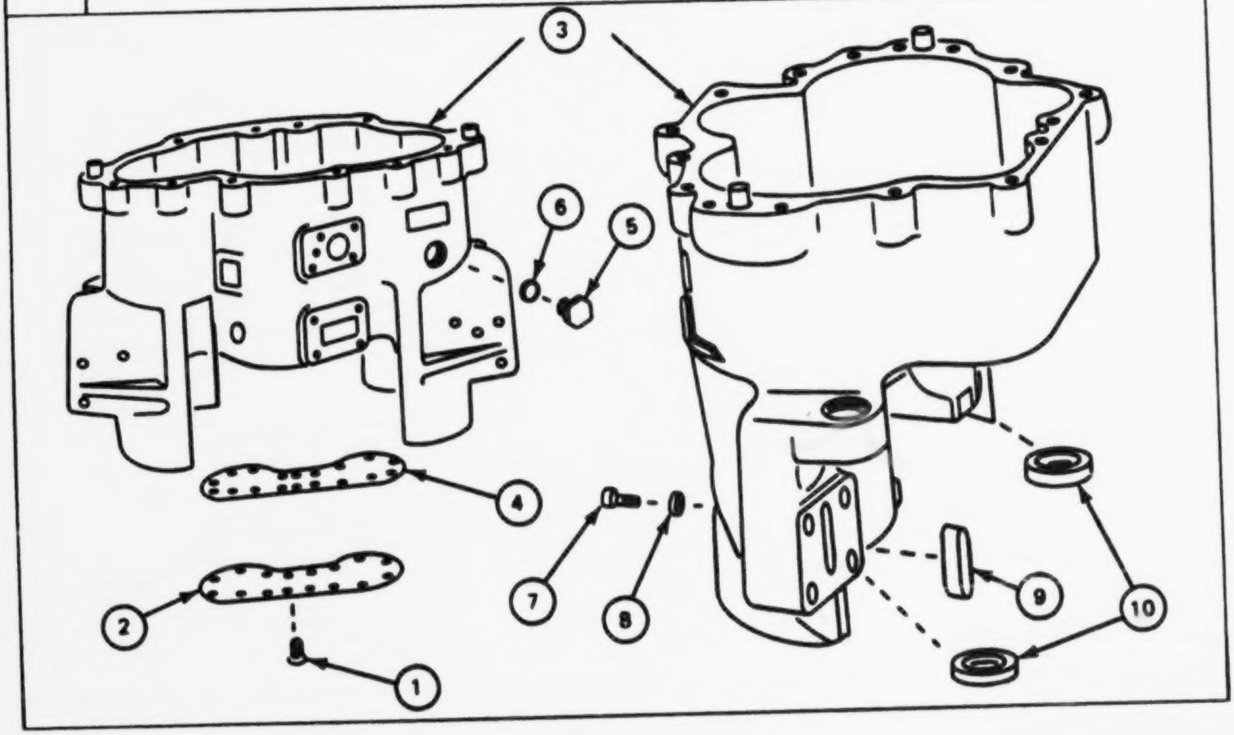
Step	Procedure
1.	Using 7/16'' wrench, remove sixteen screws (1) and assembled washers that attach cover (2) to lower housing (3). Remove cover (2).
2.	Using putty knife, remove gasket (4) from lower housing (3).
3.	Using 1-1/8'' wrench, remove magnetic plug (5) and gasket (6) from lower housing (3).
4.	Using Allen wrench, remove screw (7) and lockwasher (8) that attach shear key (9) to lower housing (3). Remove shear key (9).
5.	Using hammer, drift pin, slip joint and diagonal cutting pliers, remove two oil seals (10) from lower housing (3).

NOTE

Follow-on Maintenance Action Required:

Clean all parts (JPG).
Inspect and repair all parts (JPG).
Do detail inspection of lower housing (para 20-94).

END OF TASK



20-96. LOWER HOUSING ASSEMBLY PROCEDURE

TOOLS: 7/16" combination wrench
1-1/8" combination wrench
3/16" socket head screw key (Allen wrench)
20 ounce ball peen hammer
1/4" thick plate x 2-3/4" diameter (for seal)

SUPPLIES: Oil seal (10887434) (two)
Gasket (10923855)
Gasket (8744504)

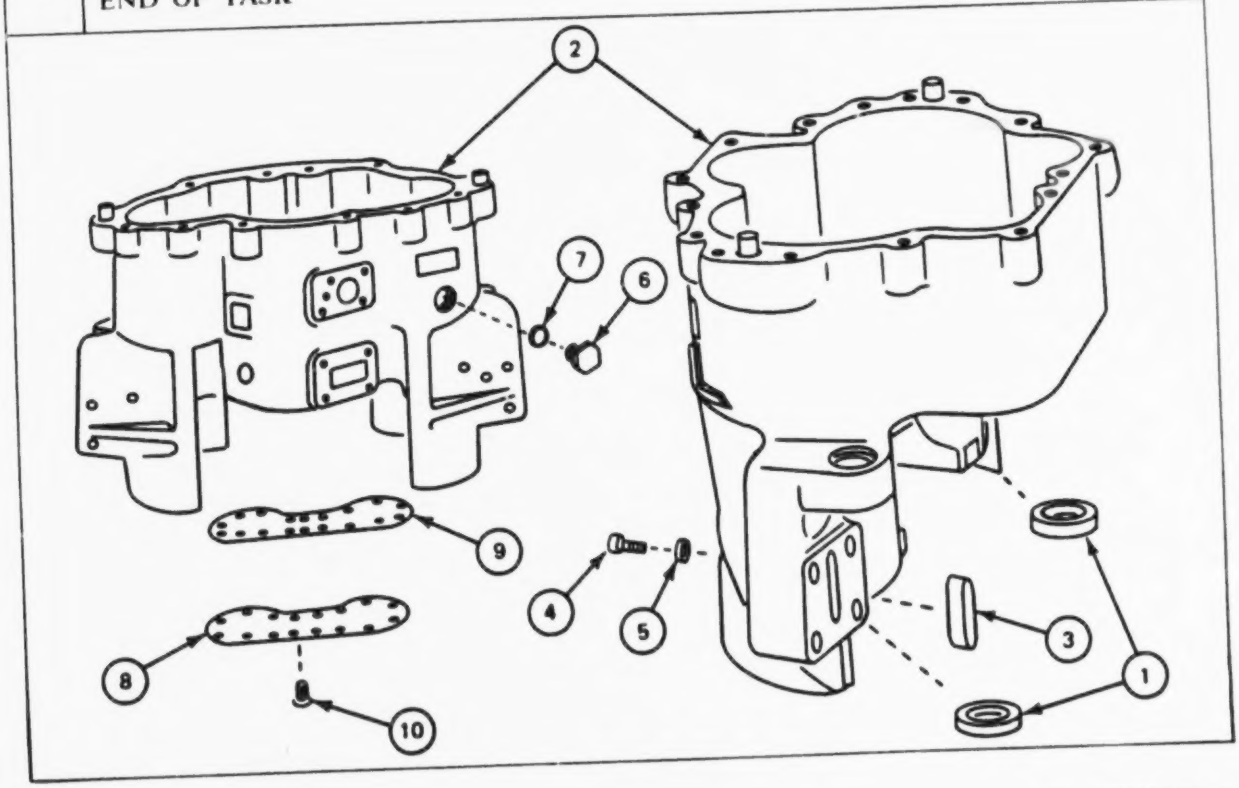
PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect lower housing (para 20-94)

20-96. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Oil seal (1) must be put in lower housing (2) with lip spring toward center of housing.
1.	Using hammer and plate, put two new oil seals (1) in lower housing (2).
2.	Using Allen wrench, attach shear key (3) to lower housing (2) with screw (4) and lockwasher (5).
3.	Using 1-1/8" wrench, put magnetic plug (6) and gasket (7) in lower housing (2).
4.	Using 7/16" wrench, attach cover (8) and gasket (9) to lower housing (2) with sixteen screws (10) and assembled washers.
	NOTE Follow-on Maintenance Action Required: Install magnetic brake (para 20-99).
	END OF TASK



20-97. LOWER HOUSING REPAIR PROCEDURE

SUPPLIES: Two bushings (7973653)
Bushing (12252649)
Adhesive/sealant (item 5, App. A)

PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect lower housing (para 20-94)

GENERAL INSTRUCTIONS:

NOTE

Procedure is used to replace bad bushings in lower housing. If lower housing is bad, order repair part or next higher assembly as required.

20-97. LOWER HOUSING REPAIR PROCEDURE (CONT)

FRAME 1

Step **Procedure**

SUPPORT SHOP WORK

1. Take lower housing and new bushings, as required, to shop where press and inspection equipment are available.

   a. Remove bad bushing.
   b. Make dimensional check.

Reference Letter	Point of Measurement	Measurement
A	Housing bore for bushing	1.0000 to 1.0010
B	Housing bore for bushing (two places)	2.3120 to 2.3130
C	OD of new bushing	1.004 to 1.005
D	OD of new bushing (two bushings)	2.3175 to 2.3205

NOTE

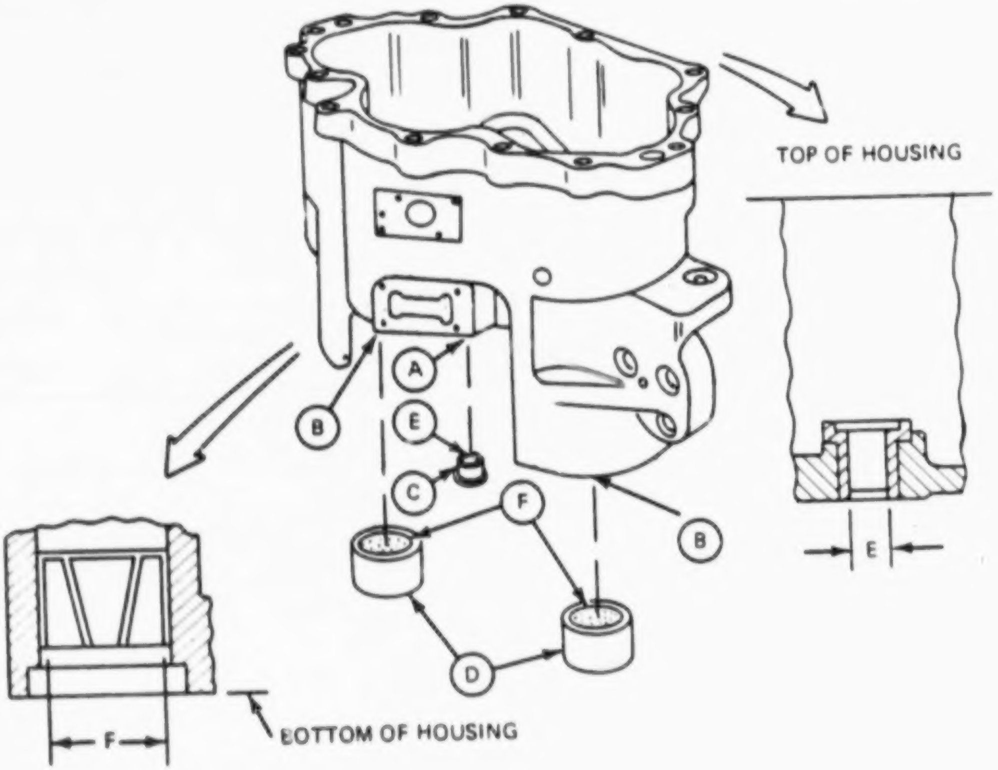
Deleted

   c. Install new bushing.
   d. Deleted.

Reference Letter	Point of Measurement	Measurement
E	ID of bushing	0.751 to 0.755
F	ID of shaft bushing	2.1250 to 2.1260
G	Top of housing to top of bushing	4.263 to 4.266

2. After support shop work, return lower housing to turret shop.

END OF TASK

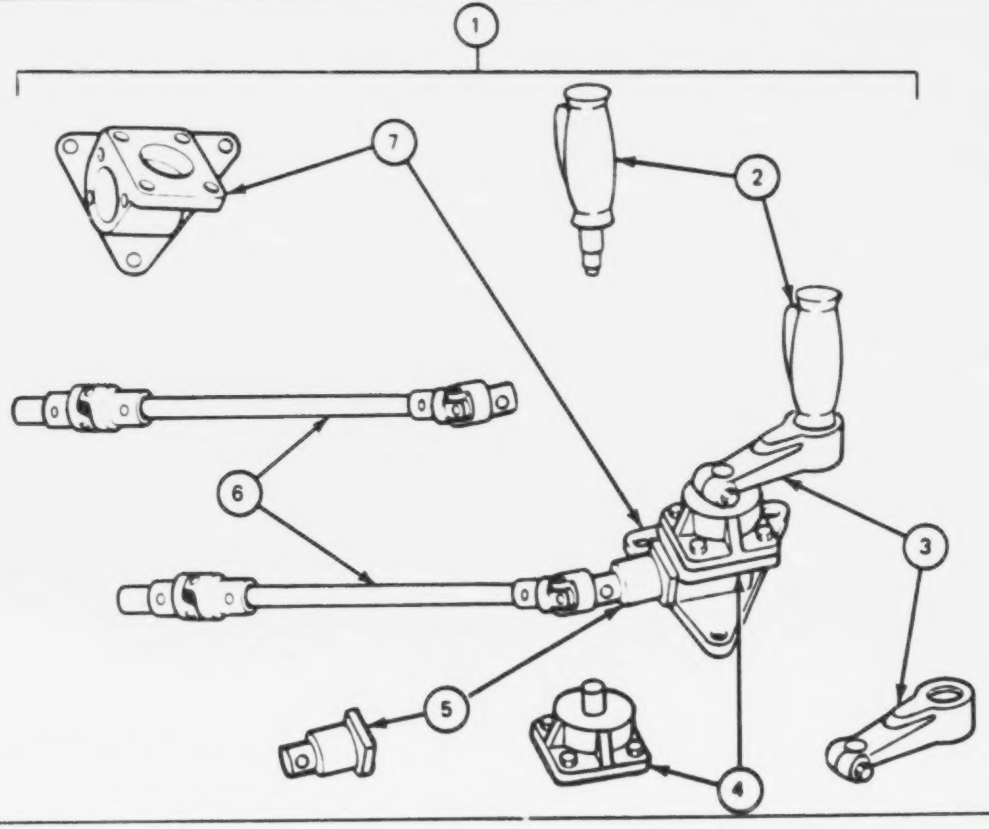

TOP OF HOUSING
A
B
E
C
F
B
D
E
F
BOTTOM OF HOUSING

CHAPTER 21

HAND TRAVERSING DRIVE

21-1. MAINTENANCE PROCEDURES INDEX

	Tasks					
Equipment Item	Test	Removal	Instal-lation	Disassembly	Assembly	Repair
1. Hand Traversing Drive	21-2	. . .	. . .	21-3	21-4	. . .
2. Crank Handle	. . .	21-5	21-6	21-7	21-8	. . .
3. Crank Arm	. . .	21-9	21-10	21-11	21-12	21-13
4. Drive Gear	. . .	21-14	21-15	. . .	. . .	21-16
5. Output Gear	. . .	21-17	21-18	. . .	. . .	21-19
6. Driveshaft	. . .	21-20	21-21	21-22	21-23	. . .
7. Housing	. . .	21-17	21-18	. . .	. . .	. . .



21-2. HAND TRAVERSING DRIVE TEST PROCEDURE

TOOLS: Vise

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove hand traversing drive

EQUIPMENT CONDITION: Hand traversing drive removed (TM-20-2-3)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, replace bad part listed in Probable Fault column. Refer to section index (para 21-1) for replacement of bad part.

21-2. HAND TRAVERSING DRIVE TEST PROCEDURE (CONT)

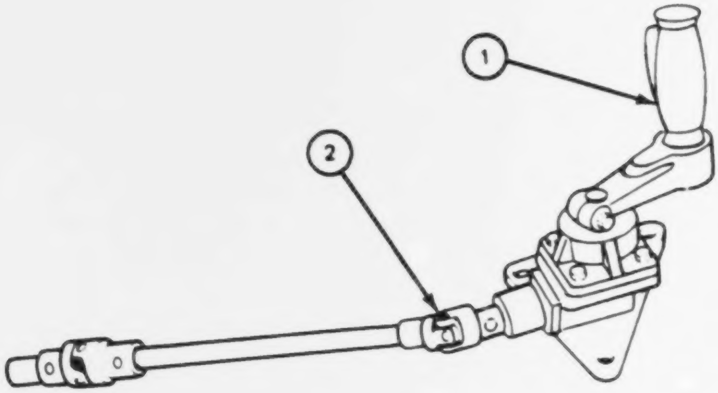
FRAME 1

Step	Procedure	Normal Indication	Probable Fault
1.	Place hand traversing drive (1) housing in vise and allow driveshaft (2) to hang downward.		
2.	Unlock and turn handle (1) clockwise two turns.	Handle (1) turns freely without binding.	Bad output gear or bad drive gear.
3.	Unlock and turn handle (1) counterclockwise two turns.	Handle (1) turns freely without binding.	Bad output gear or bad drive gear.

NOTE

If normal indication was obtained in steps 1 and 2, hand traversing drive (1) is good.

END OF TASK



21-3. HAND TRAVERSING DRIVE DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove hand traversing drive

EQUIPMENT CONDITION: Hand traversing drive removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)

FRAME 1

Step	Procedure
1.	Remove crank handle (para 21-5).
2.	Remove crank arm (para 21-9).
3.	Remove drive gear (para 21-14).
4.	Remove output gear and driveshaft (para 21-17).
5.	Disassemble crank handle (para 21-7).
6.	Disassemble crank arm (para 21-11).
7.	Disassemble driveshaft (para 21-22).
	END OF TASK

21-4. HAND TRAVERSING DRIVE ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Assemble driveshaft (para 21-23).
2.	Assemble crank arm (para 21-12).
3.	Assemble crank handle (para 21-8).
4.	Install output gear and driveshaft (para 21-18).
5.	Install crank arm (para 21-10).
6.	Install crank handle (para 21-6).
7.	Install drive gear (para 21-15).
	NOTE Follow-on Maintenance Action Required: Test hand traversing drive (para 21-2).
	END OF TASK

21-5. CRANK HANDLE REMOVAL PROCEDURE

TOOLS: External retaining ring pliers
20 ounce ball peen hammer
1/4" brass drift pin punch
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

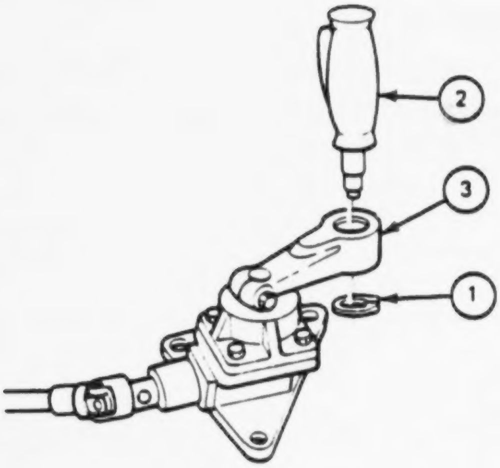
REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove hand traversing drive
JPG for procedures to:
Use retaining ring pliers
Clean parts
Inspect and repair parts

EQUIPMENT CONDITION: Hand traversing drive removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)

FRAME 1

Step	Procedure
1.	Using pliers, remove retaining ring (1) that attaches crank handle (2) to crank arm (3) (JPG).
2.	Using hammer and punch, tap crank handle (2) from crank arm (3). Remove crank handle.
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG).
	END OF TASK



21-6. CRANK HANDLE INSTALLATION PROCEDURE

TOOLS: External retaining ring pliers
3/32" socket head screw key (Allen wrench)

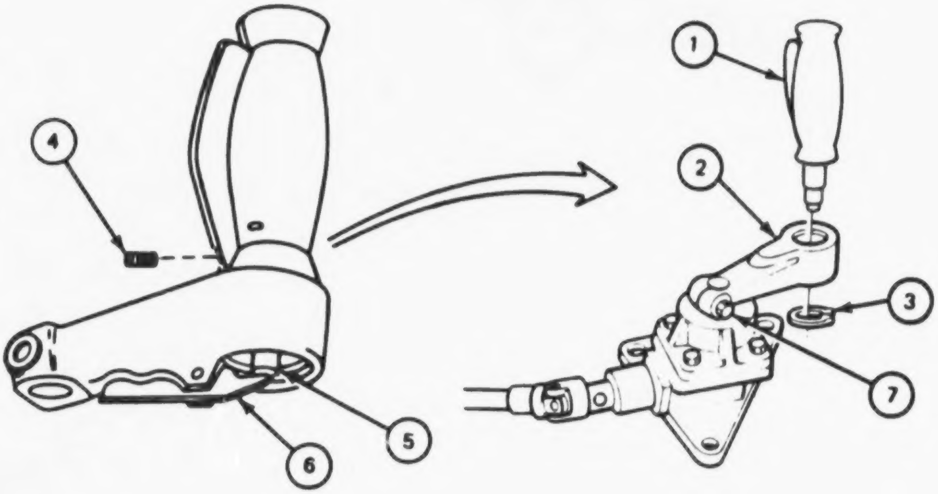
PERSONNEL: One

REFERENCES: JPG for procedure to use retaining ring pliers

PRELIMINARY PROCEDURES: Assemble crank handle (para 21-8)

FRAME 1

Step	Procedure
1.	Put crank handle (1) in crank arm (2).
2.	Using pliers, attach crank handle (1) to crank arm (2) with retaining ring (3) (JPG).
3.	Using Allen wrench, adjust setscrew (4) so that shaft (5) rests against locking lever (6) when locked to housing (7).
	END OF TASK



21-7. CRANK HANDLE DISASSEMBLY PROCEDURE

TOOLS: 20 ounce ball peen hammer
5/32" drive pin punch
3/32" socket head screw key (Allen wrench)
Vise
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

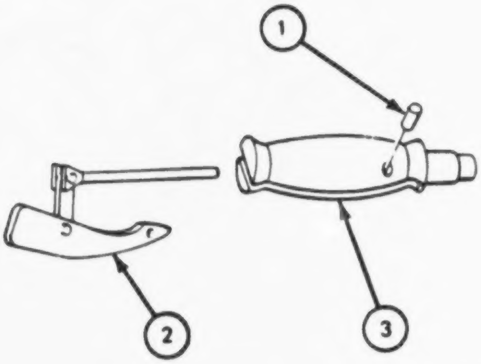
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)

FRAME 1

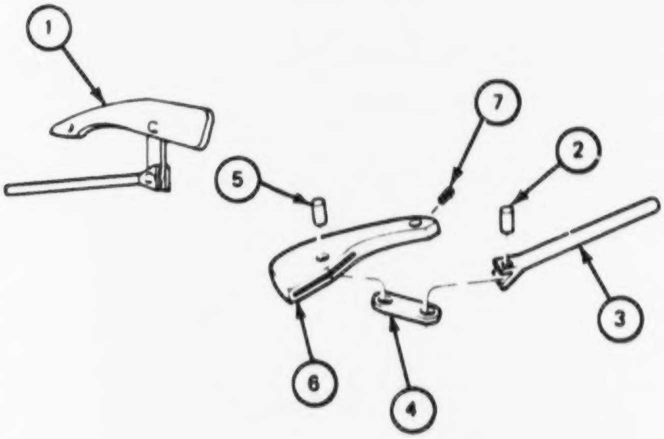
Step	Procedure
	NOTE Pin (1) may be located on either end of crank handle (3).
1.	Using hammer and punch, remove pin (1) that attaches lever (2) in crank handle (3).
2.	Remove lever (2) from crank handle (3).
	GO TO FRAME 2



21-7. CRANK HANDLE DISASSEMBLY PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Put lever (1) in vise.
2.	Using hammer and punch, remove pin (2) that attaches shaft (3) to link (4).
3.	Remove shaft (3).
4.	Using hammer and punch, remove pin (5) that attaches link (4) to lever (6).
5.	Remove link (4).
6.	Using Allen wrench, remove setscrew (7) from lever (6).
	NOTE
	Follow-on Maintenance Action Required:
	Clean all parts (JPG). Inspect and repair all parts (JPG).
	END OF TASK



21-8. CRANK HANDLE ASSEMBLY PROCEDURE

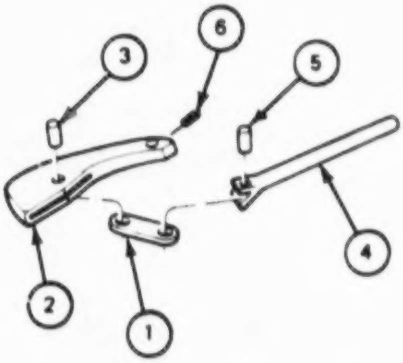
TOOLS: 20 ounce ball peen hammer
3/32" socket head screw key (Allen wrench)

SUPPLIES: Grease (item 14, App. A)

PERSONNEL: One

FRAME 1

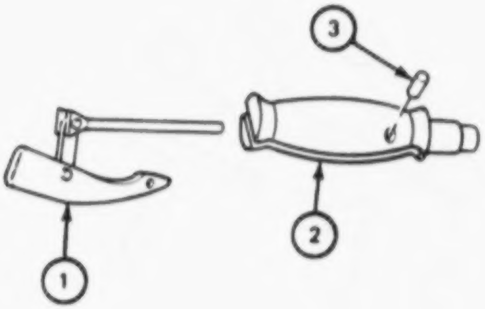
Step	Procedure
1.	Put link (1) in handle lever (2).
2.	Using hammer, put in pin (3) that attaches link (1) to handle lever (2).
3.	Put shaft (4) on link (1).
4.	Using hammer, put in pin (5) that attaches shaft (4) to link (1).
5.	Put a light coat of grease on shaft (4).
6.	using Allen wrench, put setscrew (6) in handle lever (2).
	GO TO FRAME 2



21-8. CRANK HANDLE ASSEMBLY PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Put lever (1) in crank handle (2). Line up hole in lever with hole in crank handle. **NOTE** Pin (3) may be located on either end of crank handle (2).
2.	Using hammer and punch, put in pin (3) that attaches lever (1) in crank handle (2). **NOTE** Follow-on Maintenance Action Required: Install crank handle (para 21-6). END OF TASK



21-9. CRANK ARM REMOVAL PROCEDURE

TOOLS: 1/2" combination wrench
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

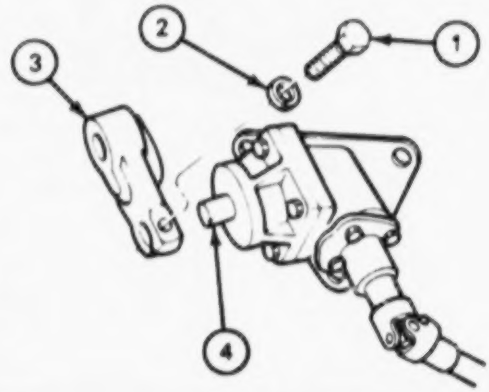
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)

FRAME 1

Step	Procedure
1.	Using wrench, remove screw (1) and lockwasher (2) that attach crank arm (3) to drive gearshaft (4).
2.	Using hammer, tap crank arm (3) from drive gearshaft (4). Remove crank arm. **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Repair bad bearing in crank arm (para 21-13) after disassembly (para 21-11). END OF TASK



21-10. CRANK ARM INSTALLATION PROCEDURE

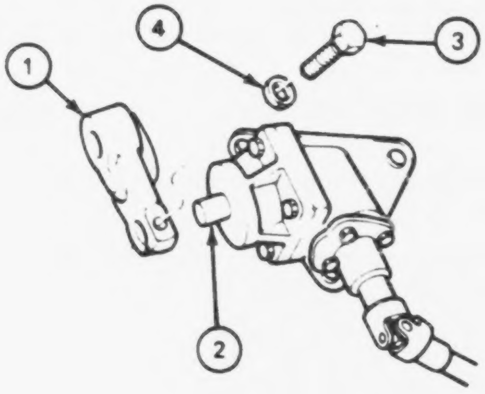
TOOLS: 1/2" combination wrench

PERSONNEL: One

PRELIMINARY PROCEDURES: Assemble crank arm (para 21-12)

FRAME 1

Step	Procedure
1.	Put crank arm (1) on drive gearshaft (2).
2.	Put screw (3) with lockwasher (4) through flat side of crank arm (1).
3.	Using wrench, attach crank arm (1) to drive gearshaft (2) with screw (3) and lockwasher (4).
	NOTE Follow-on Maintenance Action Required: Install crank handle (para 21-6).
	END OF TASK



21-11. CRANK ARM DISASSEMBLY PROCEDURE

TOOLS: 20 ounce ball peen hammer
5/32" drive pin punch
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

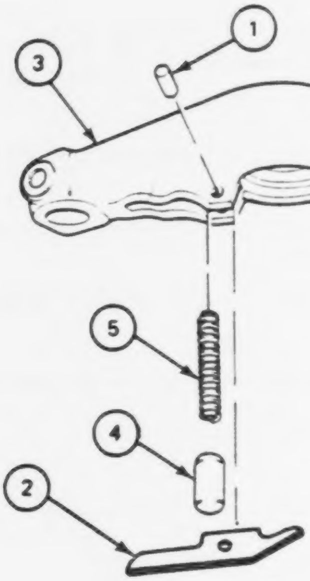
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)
Remove crank arm (para 21-9)

FRAME 1

Step	Procedure
	WARNING Spring (5) can fly out. Place crank arm (3) so that when spring is let go, spring does not hit you but falls on work bench.
1.	Using hammer and punch, remove pin (1) that attaches locking lever (2) to crank arm (3).
2.	Remove locking lever (2), plunger (4), and spring (5). END OF TASK



21-12. CRANK ARM ASSEMBLY PROCEDURE

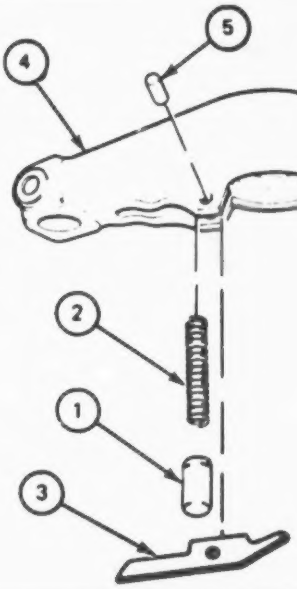
TOOLS: 20 ounce ball peen hammer
5/32" drive pin punch

SUPPLIES: Grease (item 14, App. A)

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Put a light coat of grease on plunger (1).
	WARNING When compressing spring (2), take care spring does not release and hurt you.
2.	Put spring (2), plunger (1), and locking lever (3) in crank arm (4). Line up hole in lever (3) and hole in crank arm (4).
3.	Using hammer and punch, put in pin (5) that attaches lever (3) to crank arm (4).
	NOTE Follow-on Maintenance Action Required: Install crank arm (para 21-10).
	END OF TASK



21-13. CRANK ARM REPAIR PROCEDURE

SUPPLIES: Needle bearing (B138XOH)
Ball bearing (712214)
Retaining ring (MS-16625-1165)
Grease (item 14, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to grease bearings

GENERAL INSTRUCTIONS:

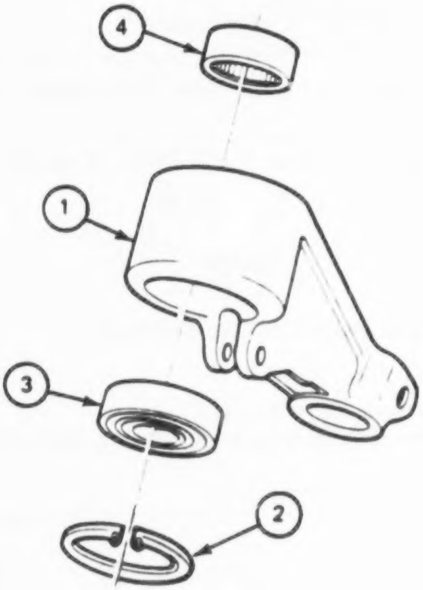
NOTE

Procedure is used to replace needle bearing and ball bearing in crank arm.

21-13. CRANK ARM REPAIR PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Grease new bearings (JPG).
	SUPPORT SHOP WORK
2.	Take crank arm (1) and repair parts to shop where bearing press and measuring equipment are available. a. Remove retaining ring (2), bad ball bearing (3), or bad needle bearing (4). b. Install new needle bearing (4), or new ball bearing (3), and new retaining ring (2). Install needle bearing flush to 0.03" below machined surface of crank arm (1).
3.	After support shop work, return crank arm (1) to turret shop.
	END OF TASK



21-14. DRIVE GEAR REMOVAL PROCEDURE

TOOLS: 7/16" combination wrench
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

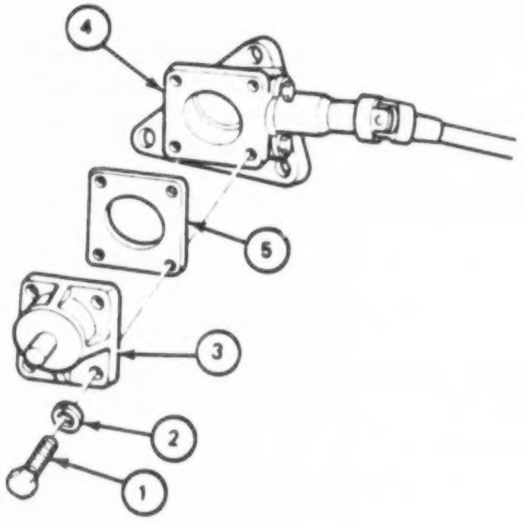
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)
Remove crank arm (para 21-9)

FRAME 1

Step	Procedure
1.	Using wrench, remove four screws (1) and four lockwashers (2) that attach drive gear (3) to housing (4).
2.	Using hammer, tap drive gear (3) from housing (4). Remove drive gear (3) and shims (5).
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Repair bad bearing in drive gear housing (para 21-16).
	END OF TASK



21-15. DRIVE GEAR INSTALLATION PROCEDURE

TOOLS: 7/16" combination wrench

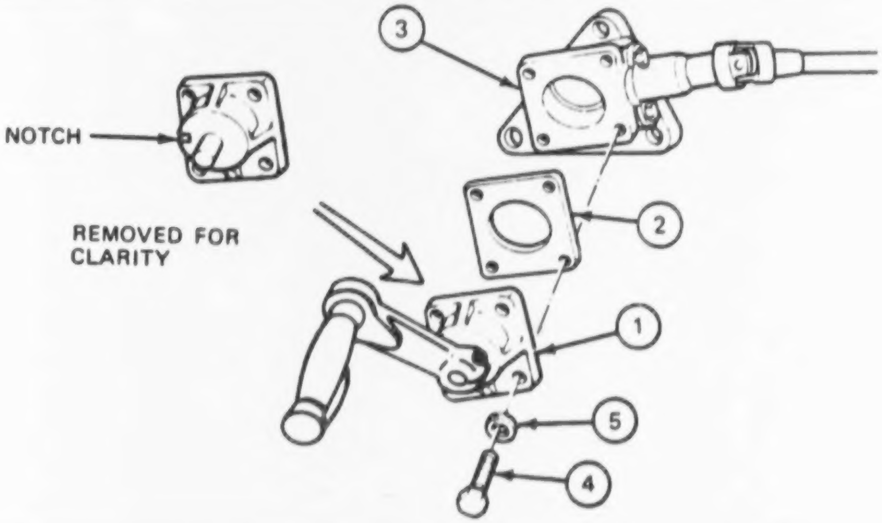
SUPPLIES: Shim (7365052)
Grease (item 14, App. A)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install output gear (para 21-18)
Assemble crank arm (para 21-12)
Install crank arm (para 21-10)
Assemble crank handle (para 21-8)
Install crank handle (para 21-6)

FRAME 1

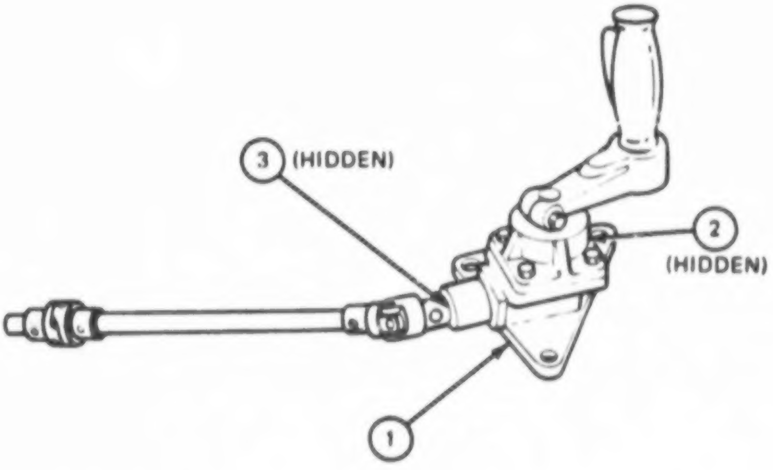
Step	Procedure
1.	Put a light coat of grease on teeth of drive gear (1).
2.	Put shim (2) over drive gear (1).
	NOTE Position drive gear (1) with notch to left.
3.	Using wrench, attach drive gear (1) to housing (3) with four screws (4) and four lockwashers (5).
	GO TO FRAME 2



21-15. DRIVE GEAR INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
	SUPPORT SHOP WORK
1.	Take hand traversing drive (1) to support shop where dial indicator is available.
	NOTE Proper backlash between drive gear (2) and output gear (3) is 0.000 to 0.003 inch.
2.	Measure for proper backlash.
3.	If backlash is bad, add to or subtract from shim at drive gear (2) and output gear (3) as needed. Repeat step 2.
4.	After support shop work, return hand traversing drive (1) to turret shop.
	END OF TASK



21-16. DRIVE GEAR REPAIR PROCEDURE

SUPPLIES: Needle bearing (MS17131-23)
Ball bearing (712215)
Grease (item 14, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to grease bearings

GENERAL INSTRUCTIONS:

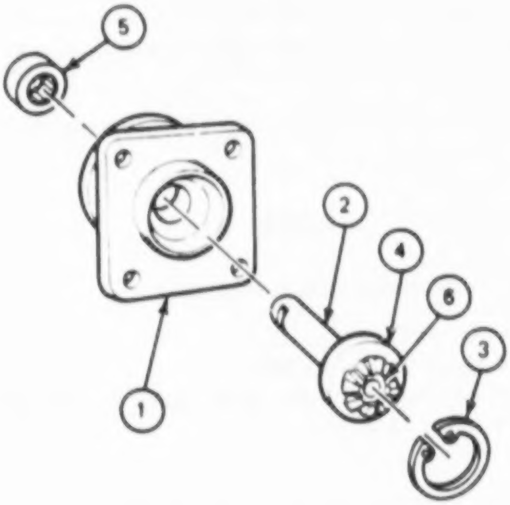
NOTE

Procedure is used to replace needle bearing and ball bearing in drive gear housing.

21-16. DRIVE GEAR REPAIR PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Grease new bearings (JPG).
	SUPPORT SHOP WORK
2.	Take housing (1) with drive gearshaft (2), and repair parts to support shop where bearing puller, press, and measuring equipment are available. a. Remove retaining ring (3) and drive gearshaft (2). b. Remove bad ball bearing (4) or bad needle bearing (5). c. Install new ball bearing (4) or new needle bearing (5). Install needle bearing flush to 0.03" below machined surface of housing (1). d. Install drive gearshaft (2) and retaining ring (3).
3.	After support shop work, return housing (1) with drive gearshaft (2) to turret shop.
	END OF TASK



21-17. OUTPUT GEAR OR HOUSING REMOVAL PROCEDURE

TOOLS: 7/16" combination wrench
Plastic face hammer
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

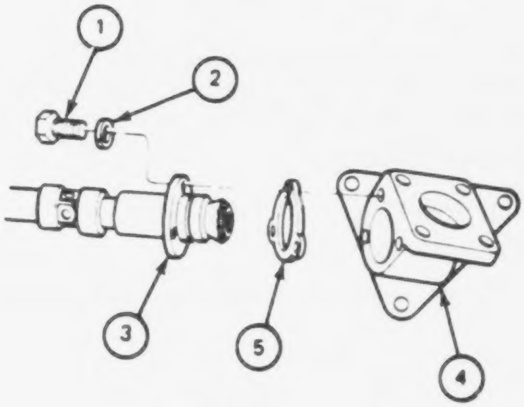
PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)
Remove crank arm (para 21-9)
Remove drive gear (para 21-14)

FRAME 1

Step	Procedure
1.	Using wrench, remove three screws (1) and three lockwashers (2) that attach output gear (3) to housing (4).
2.	Using hammer, tap drive gear (3) from housing (4). Remove output gear (3) and shims (5). **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). Repair bad bearing in output gear (para 21-19) after disassembly (para 21-22). END OF TASK



21-18. OUTPUT GEAR OR HOUSING INSTALLATION PROCEDURE

TOOLS: 7/16" combination wrench

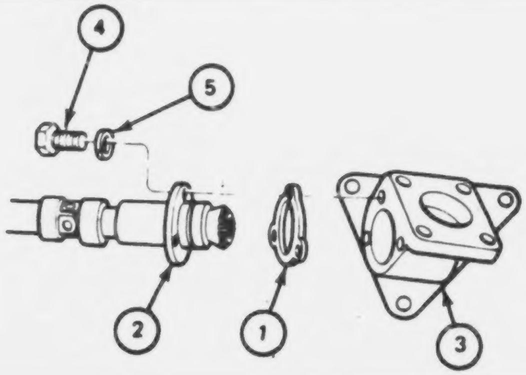
SUPPLIES: Shim (7365051)
Grease (item 14, App. A)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install driveshaft (para 21-21)

FRAME 1

Step	Procedure
	NOTE Proper backlash between output gear (2) and drive gear is needed for proper operation. Backlash is checked during drive gear installation (para 21-15).
1.	Put shim (1) over output gear (2).
2.	Put a light coat of grease on teeth of output gear (2).
3.	Put output gear (2) in housing (3).
4.	Using wrench, put in three screws (4), and three lockwashers (5) that attach output gear (2) in housing (3).
	NOTE Follow-on Maintenance Action Required: Install drive gear (para 21-15).
	END OF TASK



21-19. OUTPUT GEAR REPAIR PROCEDURE

SUPPLIES: Ball bearing (7973659)
Needle bearing (MS17131-44)
Grease (item 14, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to grease bearings

GENERAL INSTRUCTIONS:

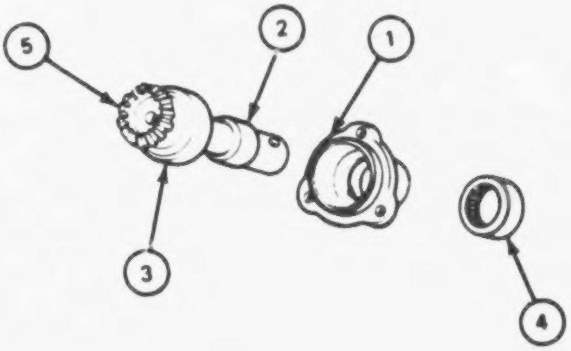
NOTE

Procedure is used to replace ball bearing in output gear housing and needle bearing in output gears housing extension.

21-19. OUTPUT GEAR REPAIR PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Grease new bearings (JPG).
	SUPPORT SHOP WORK
2.	Take housing extension (1) with output gearshaft, and repair parts (2) to support shop where bearing puller, press, and measuring equipment are available.
	a. Remove bad ball bearing (3) or bad needle bearing (4).
	b. Grease new bearing (3) or (4), and gear teeth (5).
	c. Install new needle bearing (4) or new ball bearing (3). Install needle bearing flush to 0.03" below machined surface of housing extension (1).
3.	After support shop work, return housing extension (1) with output gearshaft (2) to turret shop.
	END OF TASK



21-20. DRIVESHAFT REMOVAL PROCEDURE

TOOLS: 20 ounce ball peen hammer
Plastic face hammer
5/32" drive pin punch
Cold chisel (1/4" w cut, 4" lg)
Flat file
Vise
Scraper
Stiff bristled brush

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

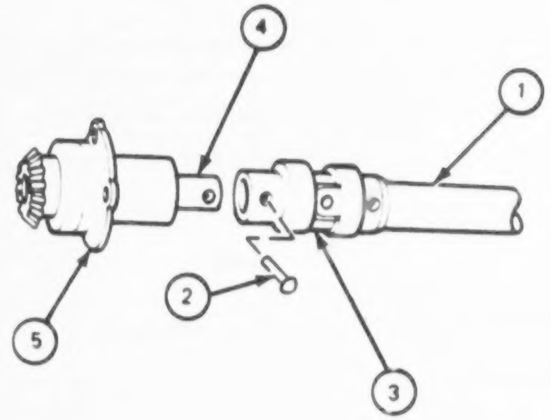
PERSONNEL: One

REFERENCES: JPG for procedures to:
Remove rivets
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)
Remove crank arm (para 21-9)
Remove drive gear (para 21-14)
Remove output gear (para 21-17)

FRAME 1

Step	Procedure
1.	Put driveshaft (1) in vise.
2.	Using ball peen hammer, chisel, file, and punch, remove rivet (2) that attaches universal joint (3) to output gearshaft (4) (JPG).
3.	Remove universal joint (3) from output gearshaft (4).
4.	Using plastic face hammer, tap output gearshaft (4) from housing extension (5).
5.	Remove driveshaft (1) from vise. **NOTE** Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG). END OF TASK



21-21. DRIVESHAFT INSTALLATION

TOOLS: 20 ounce ball peen hammer
7/32" drive pin punch
Drill motor
0.223" to 0.224" reamer

SUPPLIES: Rivet (102661)

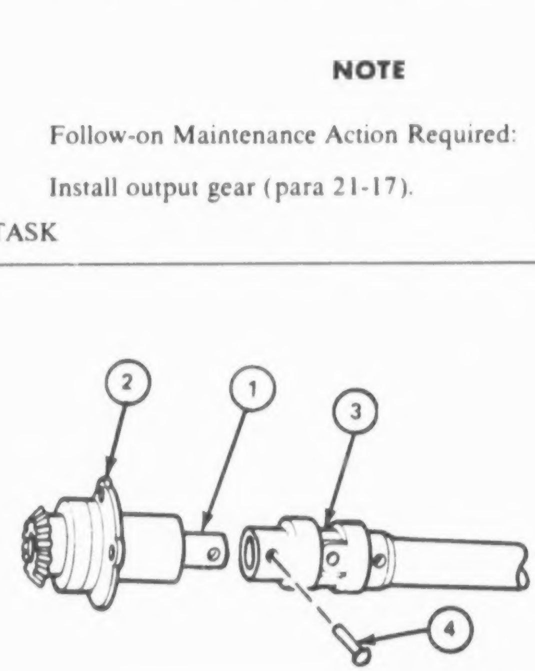
PERSONNEL: One

REFERENCE: JPG for procedure to install rivets

PRELIMINARY PROCEDURES: Driveshaft assembled (para 21-23)

FRAME 1

Step	Procedure
1.	Put output gearshaft (1) in housing extension (2).
2.	Using drill motor and reamer, ream existing hole in output gearshaft (1) and hole in universal joint (3). Remove all sharp edges and burrs from holes.
3.	Line up hole in output gearshaft (1) with hole on universal joint (3).
4.	Using hammer and punch, attach universal joint (3) to output gearshaft with rivet (4) (JPG).
	NOTE Follow-on Maintenance Action Required: Install output gear (para 21-17).
	END OF TASK



21-22. DRIVESHAFT DISASSEMBLY PROCEDURE

TOOLS: 20 ounce ball peen hammer
Cold chisel (1/4" w cut, 4" lg)
5/32" drive pin punch
Flat file
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

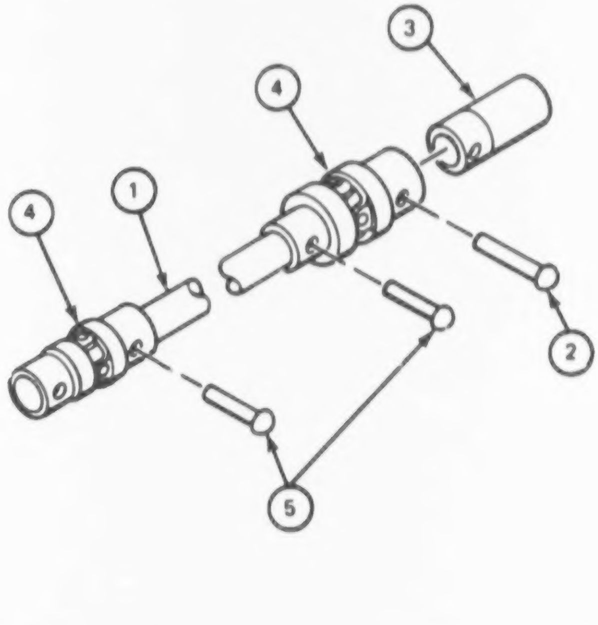
REFERENCES: JPG for procedures to:
Remove rivets
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test hand traversing drive (para 21-2)
Remove crank handle (para 21-5)
Remove crank arm (para 21-9)
Remove drive gear (para 21-14)
Remove output gear (para 21-17)
Remove driveshaft (para 21-20)

21-22. DRIVESHAFT DISASSEMBLY PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Put drive tube (1) in vise.
2.	Using hammer, chisel, file, and punch, remove rivet (2) that attaches adapter (3) to universal joint (4) (JPG).
3.	Remove adapter (3).
4.	Using hammer, chisel, file, and punch, remove two rivets (5) that attach two universal joints (4) to drive tube (1) (JPG).
5.	Remove universal joints (4) from drive tube (1).
6.	Remove drive tube (1) from vise.
	NOTE Follow-on Maintenance Action Required: Clean all parts (JPG). Inspect and repair all parts (JPG).
	END OF TASK



21-23. DRIVESHAFT ASSEMBLY PROCEDURE

TOOLS: 20 ounce ball peen hammer
7/32" drive pin punch
Drill motor
0.223" to 0.224" reamer

SUPPLIES: Rivets (102661) (three)

PERSONNEL: One

REFERENCES: JPG for procedure to install rivets

21-23. DRIVESHAFT ASSEMBLY PROCEDURE (CONT)

FRAME 1

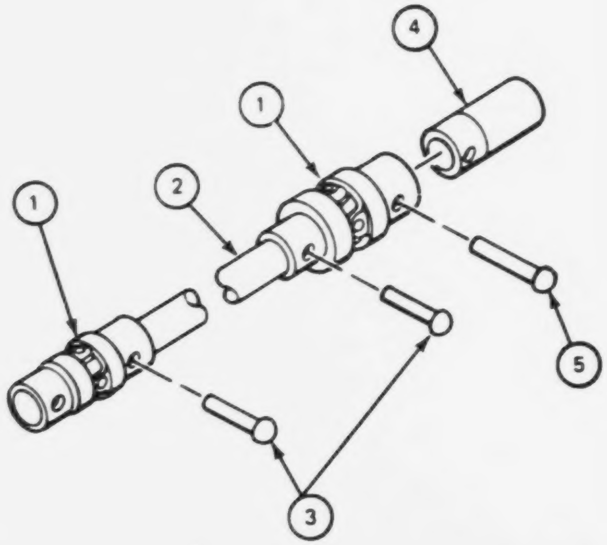
Step	Procedure
1.	Put universal joints (1) on drive tube (2). Line up holes in universal joints with holes in drive tube.
2.	Using drill motor and reamer, ream existing holes in two universal joints (1) and drive tube (2). Remove all sharp edges and burrs from holes.
3.	Using hammer and punch, attach universal joints (1) to drive tube (2) with two rivets (3) (JPG).
4.	Put adapter (4) in universal joint (1). Line up hole in adapter with hole in universal joint.
5.	Using drill motor and reamer, ream existing hole in adapter (4). Remove all sharp edges and burrs from holes.
6.	Using hammer and punch, attach adapter (4) to universal joint (3) with rivet (5) (JPG).

NOTE

Follow-on Maintenance Action Required:

Install driveshaft (para 21-23).

END OF TASK

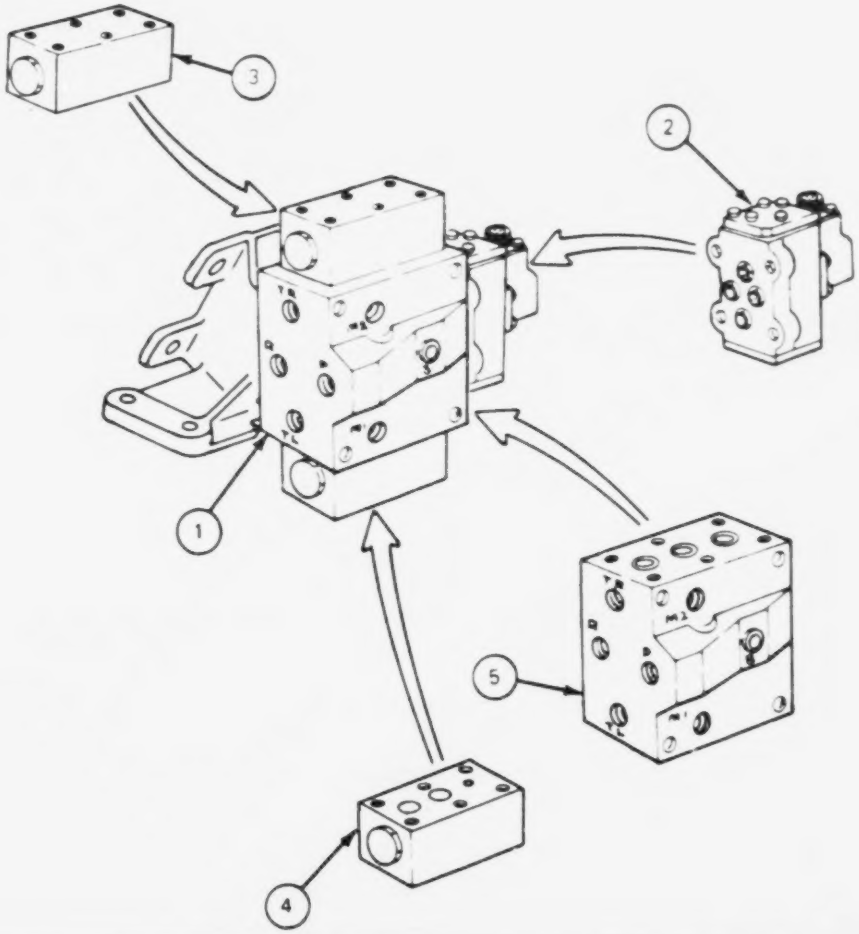


CHAPTER 22

TRAVERSE STABILIZER VALVE

22-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Tasks	
	Removal	Installation
1. Traverse Stabilizer Valve	22-2	22-3
2. Traverse Servovalve	22-4	22-5
3. Traverse Upper Pilot Check Valve	22-6	22-7
4. Traverse Lower Pilot Check Valve	22-8	22-9
5. Traverse Valve Manifold	22-10	22-11



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22-2. TRAVERSE STABILIZER VALVE REMOVAL PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)
7/16" open end wrench
9/16" open end wrench
11/16" open end wrench
7/8" open end wrench
1" open end wrench
1-1/8" open end wrench
5/32" socket head screw key (Allen wrench)
O-ring extractor kit

SUPPLIES: Masking tape (1" wide) (item 36, App. A)
Plugs for manifold ports (seven)
Caps for nipples (seven)
Rags (item 21, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Disconnect electrical connectors
Remove preformed packings
TM 9-2350-257-20-2-3 for procedure to lower hydraulic system pressure

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in tubing or parts. Dirt can damage equipment.

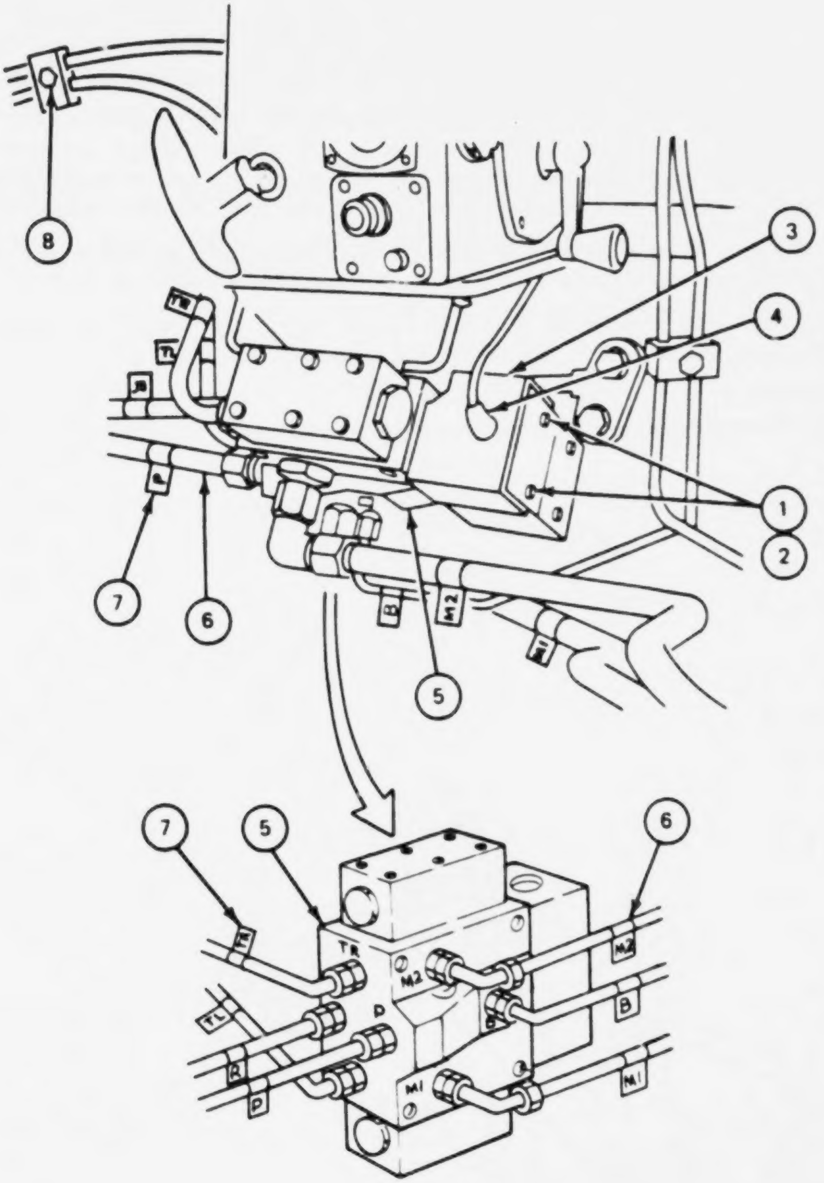
NOTE

Use rags to clean up leakage from hydraulic lines.

22-2. TRAVERSE STABILIZER VALVE REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
1.	Lower hydraulic system pressure to 0 psi (TM 20-2-3).
2.	Using 5/32" Allen wrench, remove two screws (1) and two lockwashers (2). Slide cover (3) up on electrical connector (4).
3.	Disconnect electrical connector (4) from traverse stabilizer valve (5) (JPG).
4.	Remove cover (3) from electrical connector (4).
5.	Using tape, tag each of seven hydraulic lines (6) connected to traverse stabilizer valve (5) with port identification markings (7).
6.	Using 7/16" open end wrench, loosen screw (8) of clip that holds hydraulic tubes leading from ports TL and TR of traverse stabilizer valve (5).
	GO TO FRAME 2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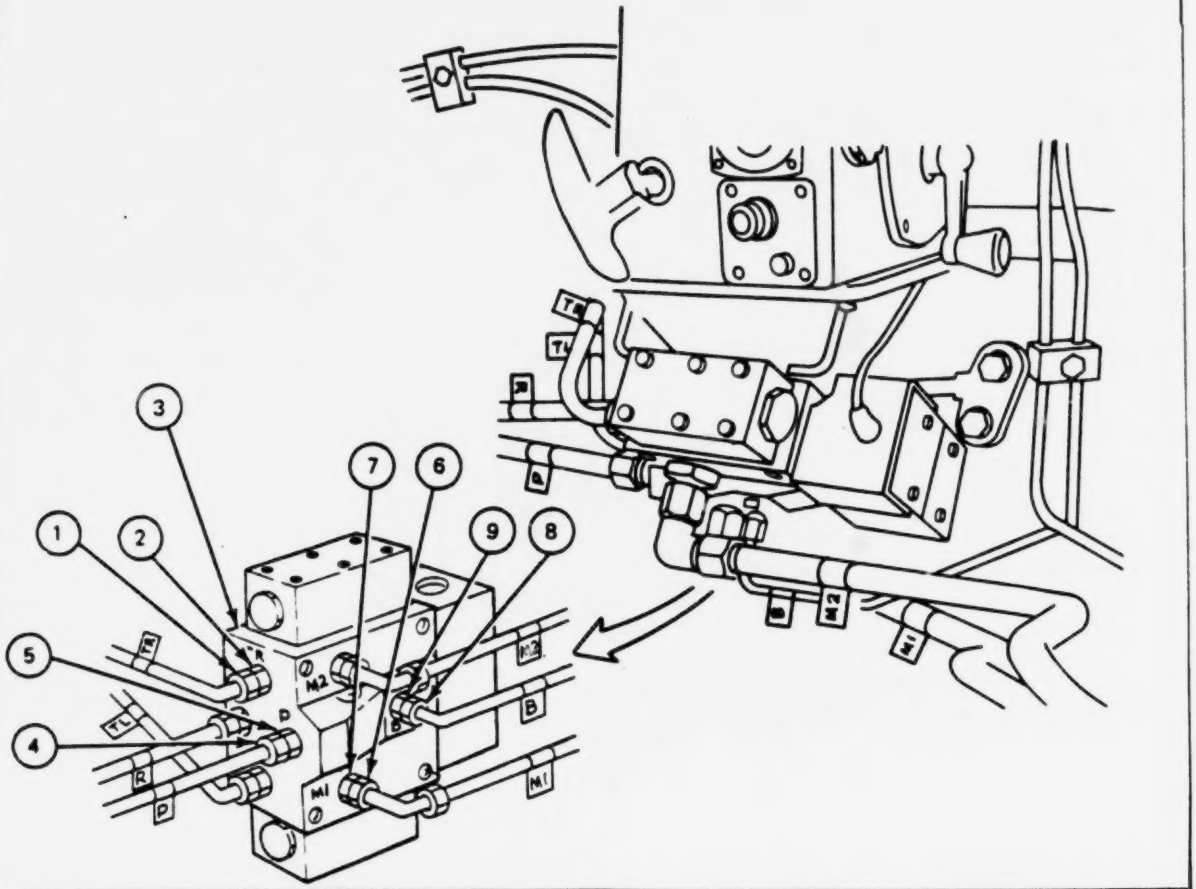
M1

22-2. TRAVERSE STABILIZER VALVE REMOVAL PROCEDURE (CONT)

FRAME 2

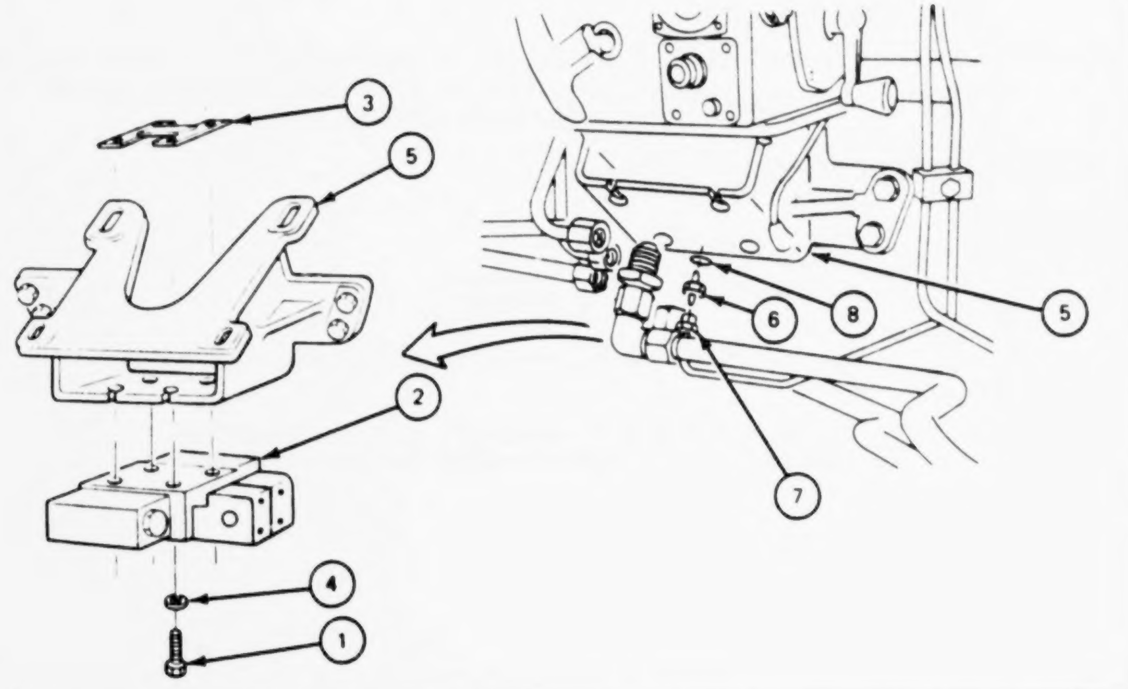
Step	Procedure
1.	Using 7/8" open end wrench on nut, and 1" open end wrench to hold nipple, remove two tube nuts (1) from two nipples (2) in ports TL and TR of traverse stabilizer valve (3).
2.	Using 1" open end wrench on nut, and 1-1/8" open end wrench to hold nipple, remove two tube nuts (4) from two nipples (5) in ports R and P of traverse stabilizer valve (3).
3.	Using 1" open end wrench on nut, and 1-1/8" open end wrench to hold nipple, remove two elbow nuts (6) from two nipples (7) in ports M1 and M2 of traverse stabilizer valve (3).
4.	Using 9/16" open end wrench on nut, and 11/16" open end wrench on nipple, remove tube nut (8) from nipple (9) in port B of traverse stabilizer valve (3). GO TO FRAME 3



22-2. TRAVERSE STABILIZER VALVE REMOVAL PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using 3/16" Allen wrench, loosen two upper screws (1) that attach traverse stabilizer valve (2) to mounting plate (3).
2.	Using 3/16" Allen wrench, remove two lower screws (1) and two lockwashers (4) that attach traverse stabilizer valve (2) to mounting plate (3).
3.	Slide traverse stabilizer valve (2) and mounting plate (3) out of mounting bracket (5).
4.	Remove two upper screws (1) and two lockwashers (4) that attach traverse stabilizer valve (2) to mounting plate (3).
5.	Using 1-1/8", 1", and 11/16" open end wrenches, remove seven nipples (6) from traverse stabilizer valve (2).
6.	Put seven nipples (6) in their hydraulic tube nuts (7).
7.	Using o-ring extractor tool, remove seven preformed packings (8) from seven nipples (6) (JPG). Throw preformed packings away.
8.	Put dust caps on seven nipples (6) and dust plugs in seven ports of traverse stabilizer valve (2).
	END OF TASK



22-3. TRAVERSE STABILIZER VALVE INSTALLATION PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)
7/16" open end wrench
9/16" open end wrench
11/16" open end wrench
7/8" open end wrench
1" open end wrench
1-1/8" open end wrench
5/32" socket head screw key (Allen wrench)
O-ring extractor kit

SUPPLIES: Hydraulic fluid (item 10, App. A)
Preformed packings (MS 28778-4) (one)
Preformed packings (MS 28778-8) (two)
Preformed packings (MS 28778-10) (four)

PERSONNEL: One

REFERENCES: TM 9-2350-257-10 for procedure to traverse turret
JPG for procedures to:
Install preformed packings
Connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

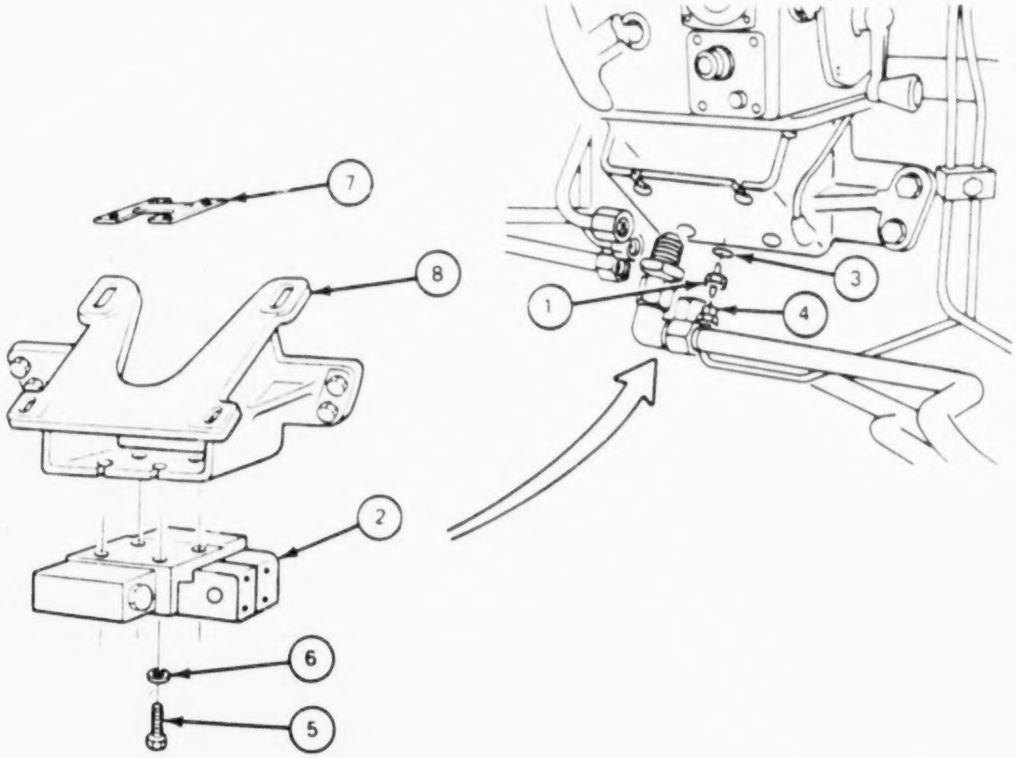
Keep dirt from getting in tubes or parts. Dirt can damage equipment.

Hydraulic lines must be connected to port per identification markings on tags to prevent possible damage to equipment.

22-3. TRAVERSE STABILIZER VALVE INSTALLATION PROCEDURE (CONT)

FRAME 1

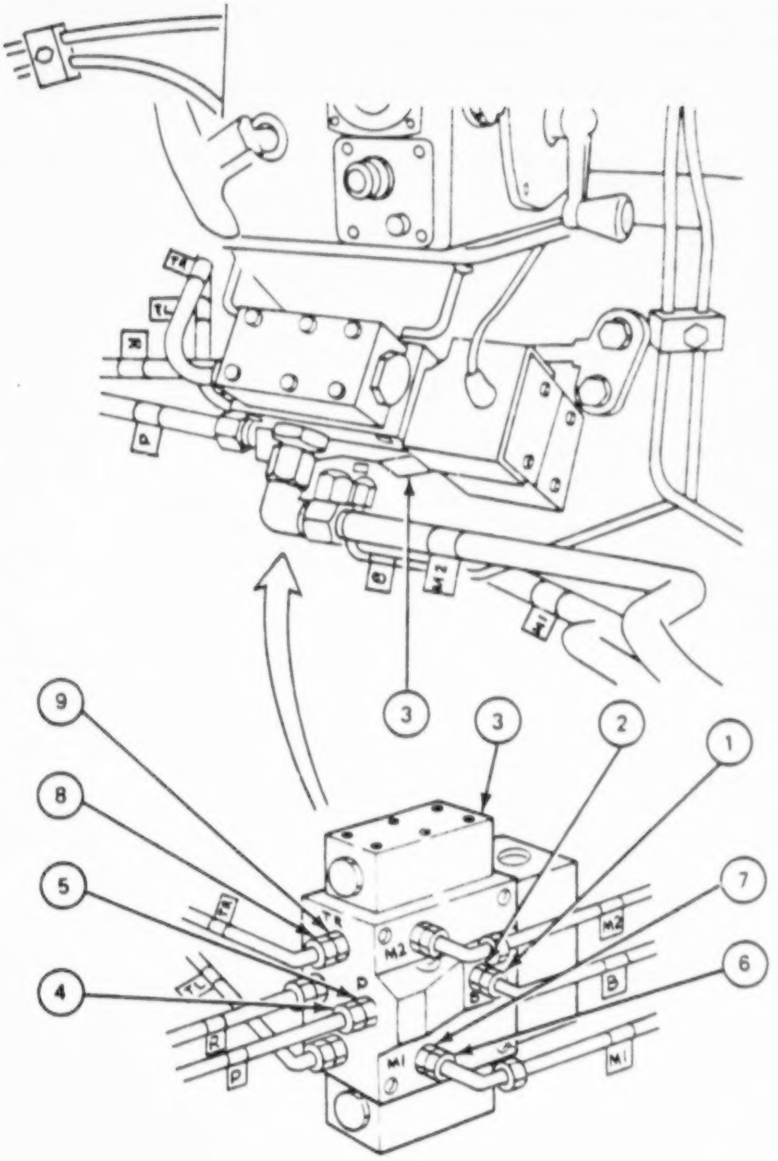
Step	Procedure
1.	Remove dust caps from seven nipples (1) and seven ports of traverse stabilizer valve (2).
2.	Lightly coat seven new preformed packings (3) with hydraulic fluid.
3.	Remove seven nipples (1) from hydraulic tube nuts (4).
4.	Using o-ring extractor tool, put seven preformed packings (3) on seven nipples (1) (JPG).
5.	Using 1-1/8", 1", and 11/16" open end wrenches, put seven nipples (1) in seven ports of traverse stabilizer valve (2).
6.	Put two upper attaching screws (5) and two lockwashers (6) through traverse stabilizer valve (2) into mounting plate (7). Do not tighten screws.
7.	Slide traverse stabilizer valve (2) and mounting plate (7) over mounting bracket (8).
8.	Put in two lower attaching screws (5) and two lockwashers (6). Do not tighten screws (5). GO TO FRAME 2



22-3. TRAVERSE STABILIZER VALVE INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using 9/16" open end wrench on nut, and 11/16" open end wrench on nipple, put nut (1) on nipple (2) in port B of traverse stabilizer valve (3).
2.	Using 1" open end wrench on nut, and 1-1/8" open end wrench to hold nipple, put two tube nuts (4) on two nipples (5) in ports R and P of traverse stabilizer valve (3).
3.	Using 1" open end wrench on nut, and 1-1/8" open end wrench to hold nipple, put two elbow nuts (6) on two nipples (7) in ports M1 and M2 of traverse stabilizer valve (3).
4.	Using 7/8" open end wrench on nut, and 1" open end wrench to hold nipple, put two tube nuts (8) on two nipples (9) in ports TL and TR of traverse stabilizer valve (3).
	GO TO FRAME 3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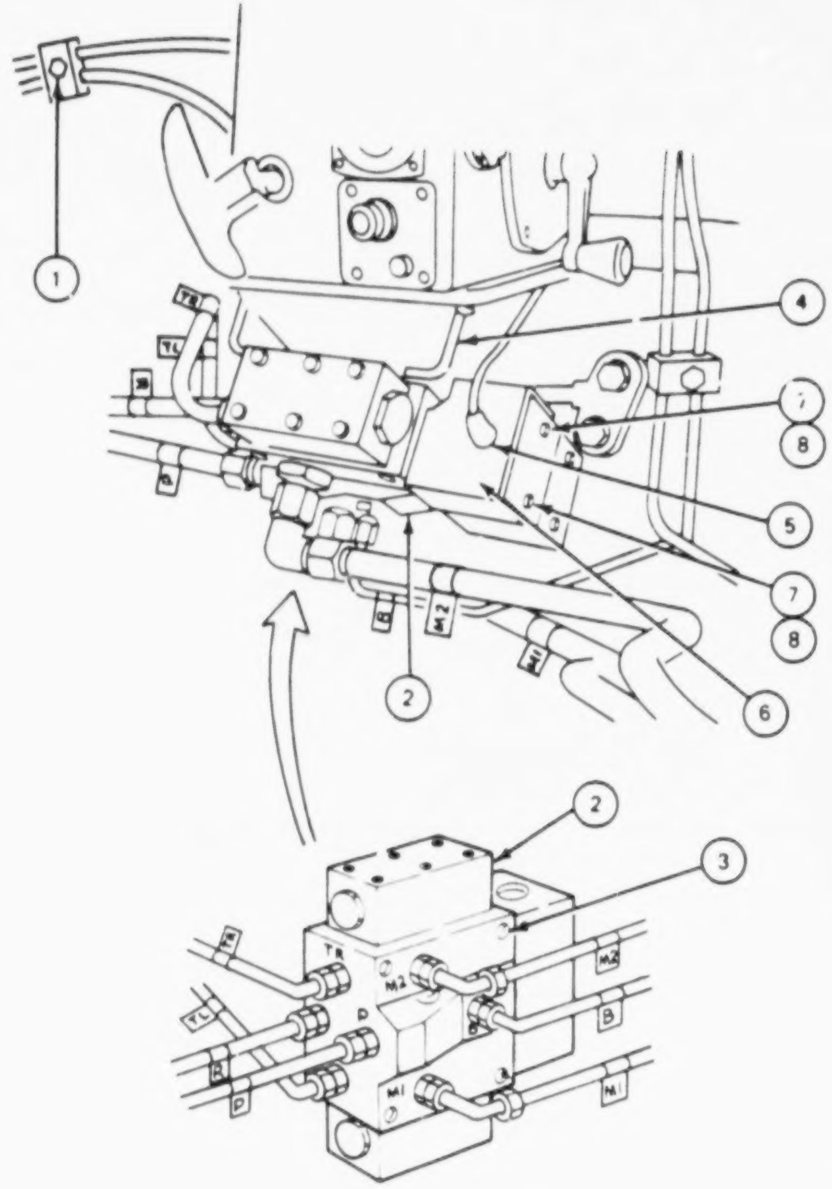
B
TL
R
P
M1
M1

Para 22-3 Cont

22-3. TRAVERSE STABILIZER VALVE INSTALLATION PROCEDURE (CONT)

FRAME 3

Step	Procedure
1.	Using 7/16" open end wrench, tighten screw (1) of clip that holds hydraulic lines leading from ports TL and TR of traverse stabilizer valve (2).
2.	Using 3/16" Allen wrench, tighten four screws (3) that attach traverse stabilizer valve (2) to mounting bracket (4).
3.	Put electrical connector (5) through hole in cover (6). Connect electrical connector (5) to traverse stabilizer valve (2) (JPG).
4.	Using 5/32" Allen wrench, attach cover (6) to traverse stabilizer valve (2) with two screws (7) and two lockwashers (8).
5.	Remove tape from hydraulic tubes.
	NOTE Follow-on Maintenance Action Required: Traverse turret a minimum of three full turns to purge air from hydraulic system (TM-10). Check for leaks. Traverse turret in stabilization mode to make certain it works properly (TM-10).
	END OF TASK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B
M1

Para 22-3 Cont

22-4. TRAVERSE SERVOVALVE REMOVAL PROCEDURE

TOOLS: 5/32" socket head screw key (Allen wrench)
11/32" open end wrench

SUPPLIES: Hydraulic plugs (eight)
Rags (item 21, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Disconnect electrical connectors
Remove preformed packings
TM 9-2350-257-20-2-3 for procedure to lower hydraulic system pressure

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in tubes or parts. Dirt can damage equipment.

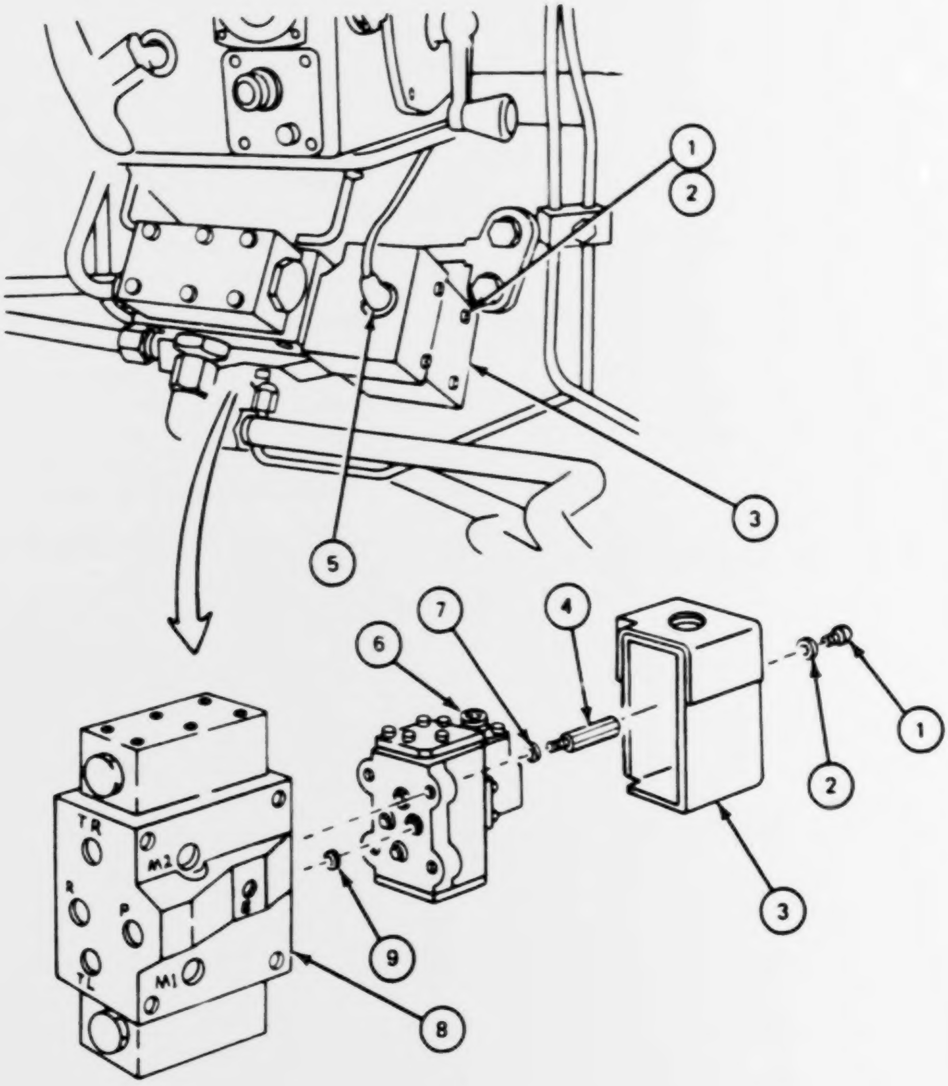
NOTE

Use rags to clean up oil spillage.

22-4. TRAVERSE SERVOVALVE REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
1.	Lower hydraulic system pressure to 0 psi (TM 20-2-3).
2.	Using Allen wrench, remove four screws (1) and four lockwashers (2), that attach two covers (3) to studs (4).
3.	Disconnect electrical connector (5) from traverse servovalve (6) (JPG). Remove two covers (3).
4.	Using open end wrench, remove four studs (4) and four lockwashers (7) that attach traverse servovalve (6) to manifold (8). Remove traverse servovalve.
5.	Remove four preformed packings (9) from traverse servovalve (6) (JPG). Throw preformed packings away.
6.	Put plugs in ports of traverse servovalve (6) and manifold (8).
	END OF TASK


TR
M2
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M1

22-5. TRAVERSE SERVOVALVE INSTALLATION PROCEDURE

TOOLS: 5/32" socket head screw key (Allen wrench)
11/32" open end wrench
11/32" socket (3/8" drive)
3/8" drive torque wrench (0 to 150 inch-pounds)

SUPPLIES: Hydraulic fluid (item 10, App. A)
Preformed packing (MS 28775-014) (four)

PERSONNEL: One

REFERENCES: TM 9-2350-257-10 for procedure to traverse turret
JPG for procedures to:
  Connect electrical connectors
  Install preformed packings
  Use torque wrench

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

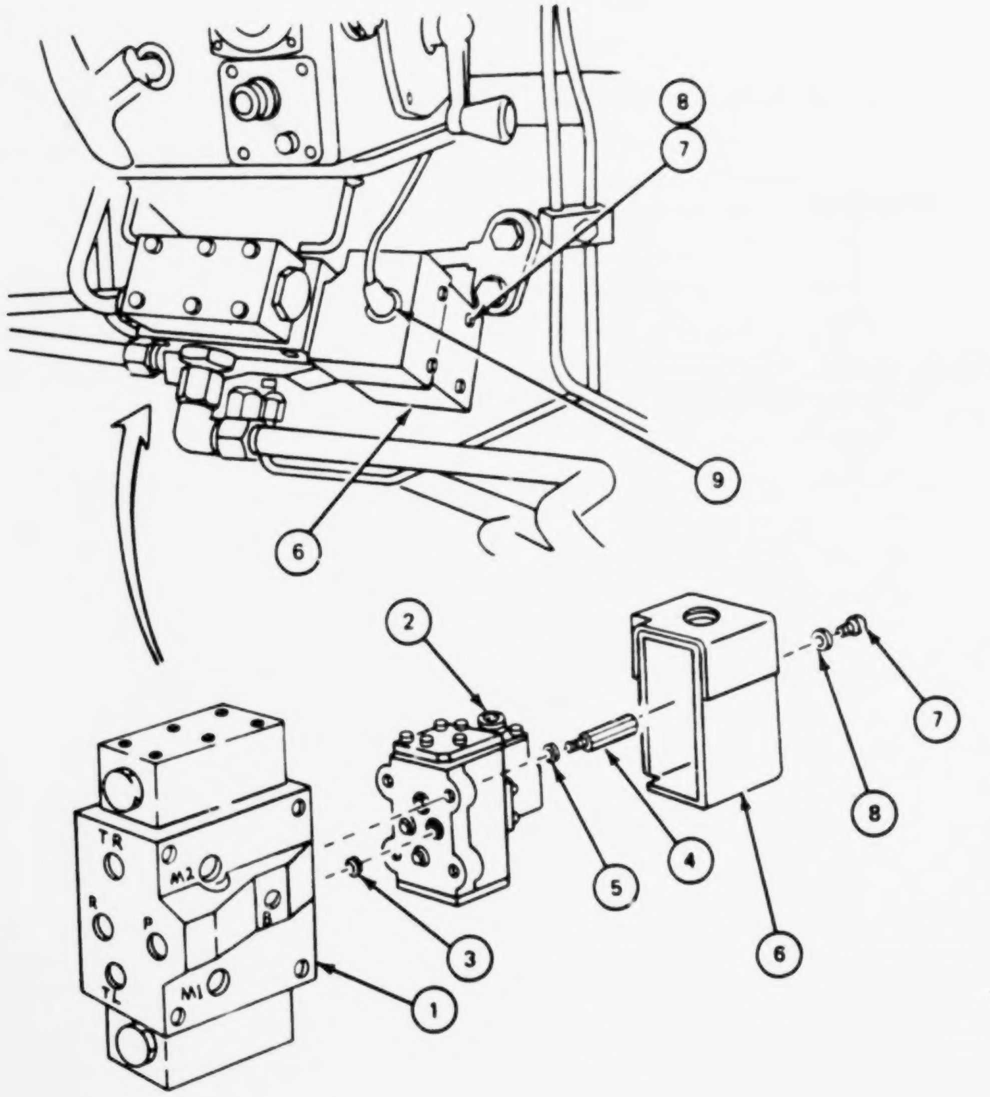
CAUTION

Keep dirt from getting in tubing or parts. Dirt can damage equipment.

22-5. TRAVERSE SERVOVALVE INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Remove eight plugs from manifold (1) and traverse servovalve (2).
2.	Lightly coat four new preformed packings (3) with hydraulic fluid.
3.	Lightly coat threads of four studs (4) with hydraulic fluid.
4.	Put four preformed packings (3) in grooves on traverse servovalve (2) (JPG).
5.	Using open end wrench, attach traverse servovalve (2) to manifold (1) with four studs (4) and four lockwashers (5).
6.	Using torque wrench, torque four studs (4) to between 29 and 39 inch-pounds for lubricated studs (or between 38 and 51 inch-pounds for dry studs) (JPG).
7.	Slide electrical connector (9) through hole in cover (6) and connect electrical connector (9) to traverse servovalve (2) (JPG).
8.	Using Allen wrench, attach two covers (6) to studs (4) with four screws (7) and four lockwashers (8).
	NOTE Follow-on Maintenance Action Required: Traverse turret for minimum of three full turns to purge hydraulic system of air (TM-10). Check for leaks. Traverse turret in stabilizaton mode to make certain it works properly (TM-10).
	END OF TASK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M1

22-6. TRAVERSE UPPER PILOT CHECK VALVE REMOVAL PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)

SUPPLIES: Hydraulic plugs (six)
Rags (item 21, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to remove preformed packings
TM 9-2350-257-20-2-3 for procedure to lower hydraulic system pressure

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

Keep dirt from getting in tubes or parts. Dirt can damage equipment.

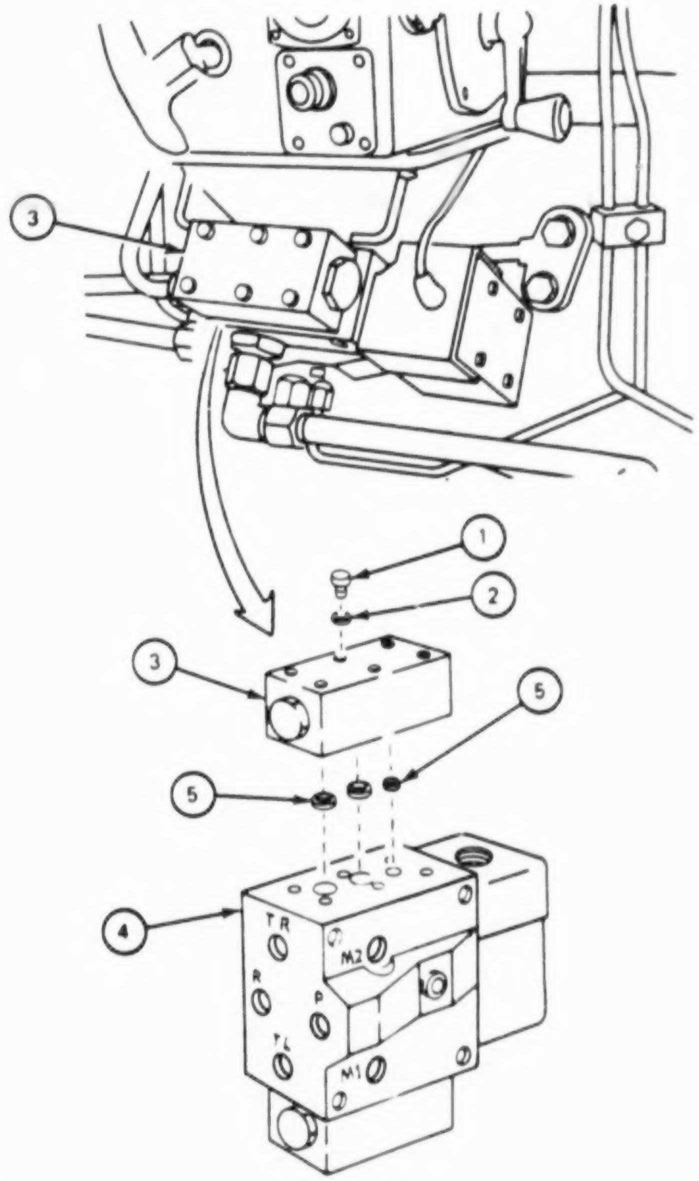
NOTE

Use rags to clean up oil spillage.

22-6. TRAVERSE UPPER PILOT CHECK VALVE REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
1.	Lower hydraulic system pressure to 0 psi (TM 20-2-3).
2.	Using wrench, remove six screws (1) and six lockwashers (2) that attach upper pilot check valve (3) to manifold (4). Remove upper pilot check valve.
3.	Remove three preformed packings (5) from upper pilot check valve (3) (JPG). Throw preformed packings away.
4.	Put plugs in ports of manifold (4) and upper pilot check valve (3).
	END OF TASK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22-7. TRAVERSE UPPER PILOT CHECK VALVE INSTALLATION PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)
3/16" hex head socket (3/8" drive)
3/8" drive torque wrench (0 to 150 inch-pounds)

SUPPLIES: Hydraulic fluid (item 10, App. A)
Preformed packing (MS 28775-14) (one)
Preformed packing (MS 28775-12) (two)

PERSONNEL: One

REFERENCES: TM 9-2350-257-10 for procedure to traverse turret
JPG for procedures to:
Install preformed packings
Use torque wrench

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

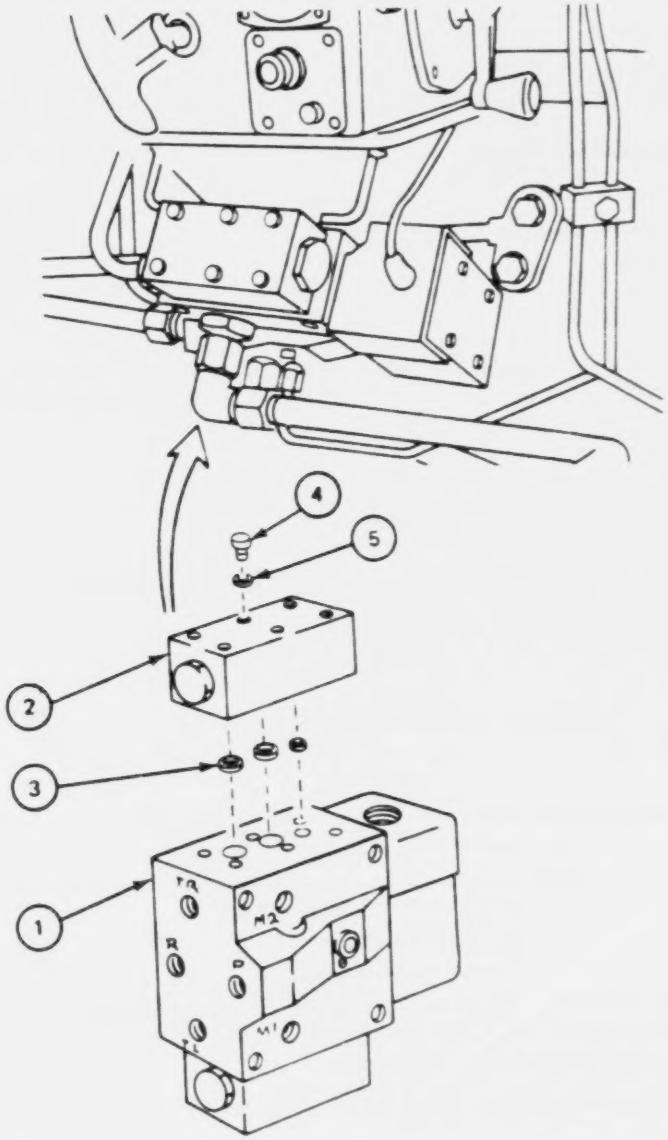
CAUTION

Keep dirt from getting in tubing or parts. Dirt can damage equipment.

22-7. TRAVERSE UPPER PILOT CHECK VALVE INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Remove plugs from ports of manifold (1) and upper pilot check valve (2).
2.	Lightly coat three new preformed packings (3) with hydraulic fluid (JPG).
3.	Lightly coat threads of six screws (4) with hydraulic fluid.
4.	Put three preformed packings (3) in grooves of upper pilot check valve (2) (JPG).
5.	Put upper pilot check valve (2) on manifold (1).
6.	Using Allen wrench, attach upper pilot check valve (2) to manifold (1) with six screws (4) and six lockwashers (5).
7.	Using torque wrench, torque six screws (4) to between 60 and 84 inch-pounds (JPG).
	NOTE Follow-on Maintenance Action Required: Traverse turret for minimum of three full turns to purge air from hydraulic system (TM-10). Check for leaks. Traverse turret in stabilization mode to make certain it works properly (TM-10).
	END OF TASK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22-8. TRAVERSE LOWER PILOT CHECK VALVE REMOVAL PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)

SUPPLIES: Hydraulic plugs (six)
Rags (item 21, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to remove preformed packings
TM 9-2350-257-20-2-3 for procedure to lower hydraulic system pressure

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

CAUTION

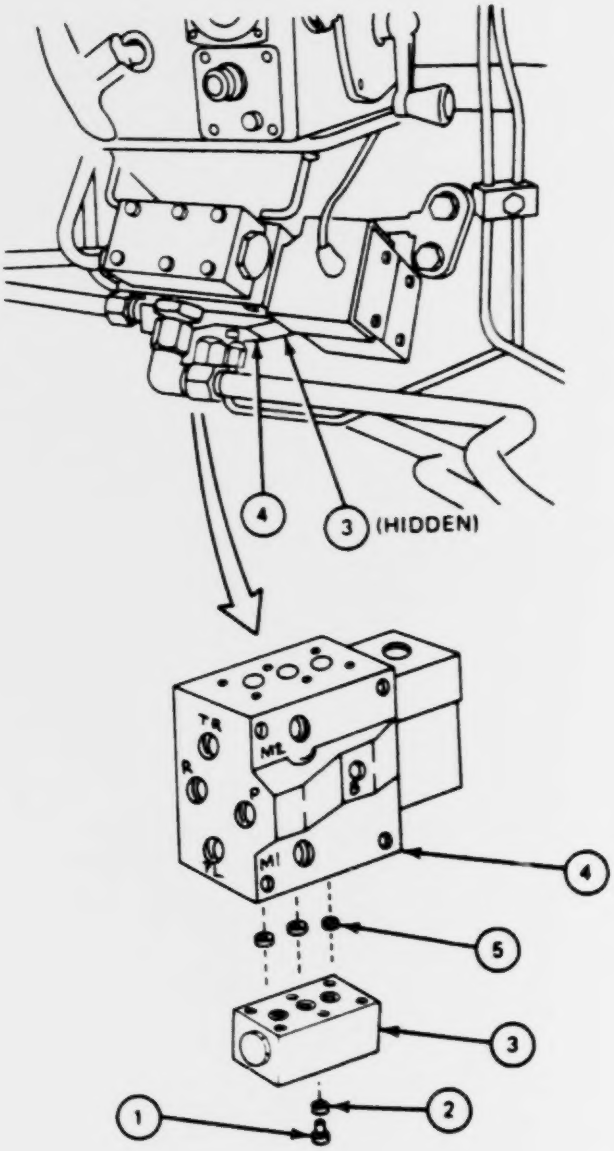
Keep dirt from getting in tubes or parts. Dirt can damage equipment.

NOTE

Use rags to clean up oil spillage.

FRAME 1

Step	Procedure
	WARNING Before removing hydraulic tubes or parts, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.
1.	Lower hydraulic system pressure to 0 psi (TM 20-2-3).
2.	Using Allen wrench, remove six screws (1) and six lockwashers (2) that attach lower pilot check valve (3) to manifold (4). Remove lower pilot check valve.
3.	Remove three preformed packings (5) from lower pilot check valve (3) (JPG). Throw preformed packings away.
4.	Put plugs in ports of manifold (4) and lower pilot check valve (3).
	END OF TASK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R
P
PL
M2
M1
4
5
3
1
2

22-9. TRAVERSE LOWER PILOT CHECK VALVE INSTALLATION PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)
3/16" hex head socket (3/8" drive)
3/8" drive torque wrench (0 to 150 inch-pounds)

SUPPLIES: Hydraulic fluid (item 10, App. A)
Preformed packing (MS 28775-14) (one)
Preformed packing (MS 28775-12) (two)

PERSONNEL: One

REFERENCES: TM 9-2350-257-10 for procedure to traverse turret
JPG for procedures to:
Install preformed packings
Use torque wrench

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-4	10
Gunner's Control Box	FO-1	2
Turret Traverse Lock	FO-4	6
Traverse Stabilizer Valve	FO-1	10

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Gunner's control box ELEV/TRAV POWER switch set to OFF
Turret traverse lock set to LOCKED

GENERAL INSTRUCTIONS:

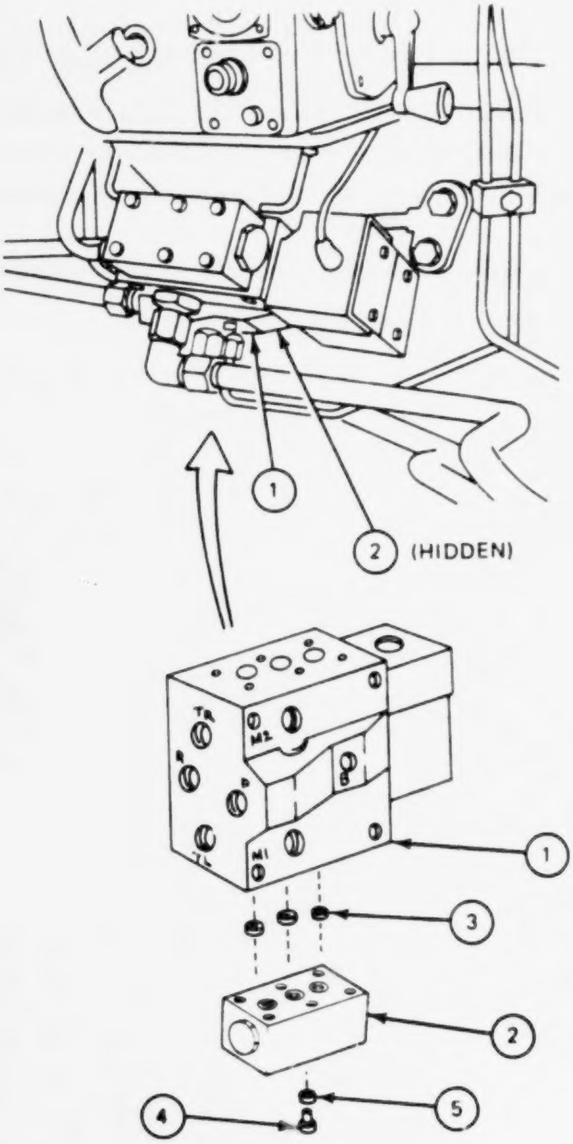
CAUTION

Keep dirt from getting in tubes or parts. Dirt can damage equipment.

22-9. TRAVERSE LOWER PILOT CHECK VALVE INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Remove plugs from ports of manifold (1) and lower pilot check valve (2).
2.	Lightly coat three new preformed packings (3) with hydraulic fluid (JPG).
3.	Lightly coat threads of six screws (4) with hydraulic fluid.
4.	Put three preformed packings (3) in grooves of lower pilot check valve (2) (JPG).
5.	Put lower pilot check valve (2) on manifold (1).
6.	Using Allen wrench, attach lower pilot check valve (2) to manifold (1) with six screws (4) and six lockwashers (5).
7.	Using torque wrench, torque six screws (4) to between 60 and 84 inch-pounds (JPG).
	NOTE Follow-on Maintenance Action Required: Traverse turret for minimum of three full turns to purge air from hydraulic system (TM-10). Check for leaks. Traverse turret in stabilization mode to make certain it works properly (TM-10).
	END OF TASK


2 (HIDDEN)

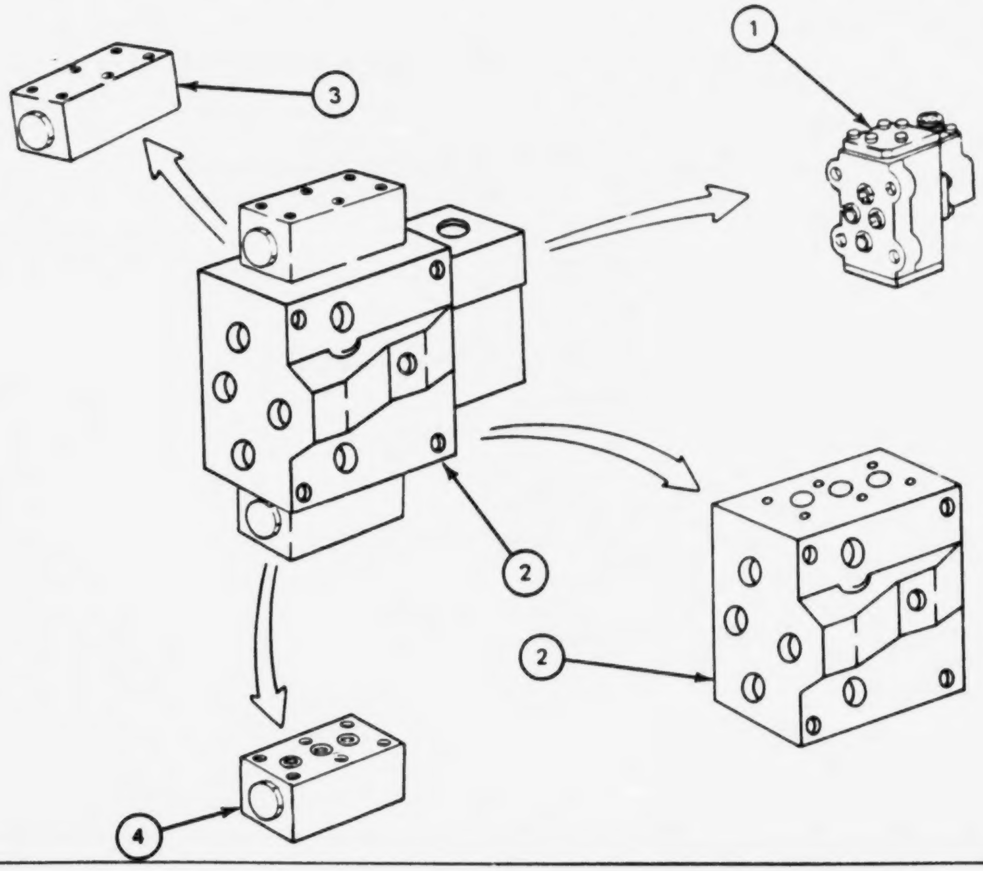
22-10. TRAVERSE VALVE MANIFOLD REMOVAL PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove traverse stabilizer valve (para 22-2)

FRAME 1

Step	Procedure
1.	Remove traverse servovalve (1) from traverse valve manifold (2) (para 22-4).
2.	Remove traverse upper pilot check valve (3) from traverse valve manifold (2) (para 22-6).
3.	Remove traverse lower pilot check valve (4) from traverse valve manifold (2) (para 22-8).
	END OF TASK

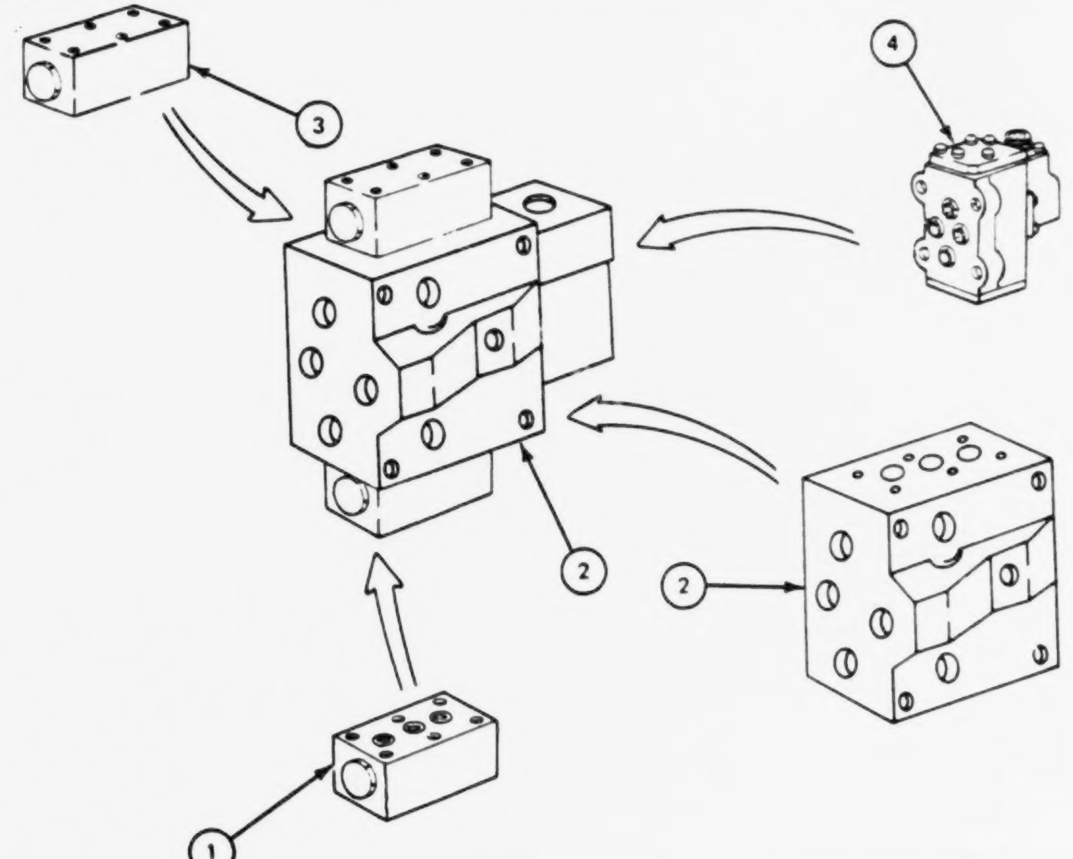


22-11. TRAVERSE VALVE MANIFOLD INSTALLATION PROCEDURE

PERSONNEL: One

FRAME 1

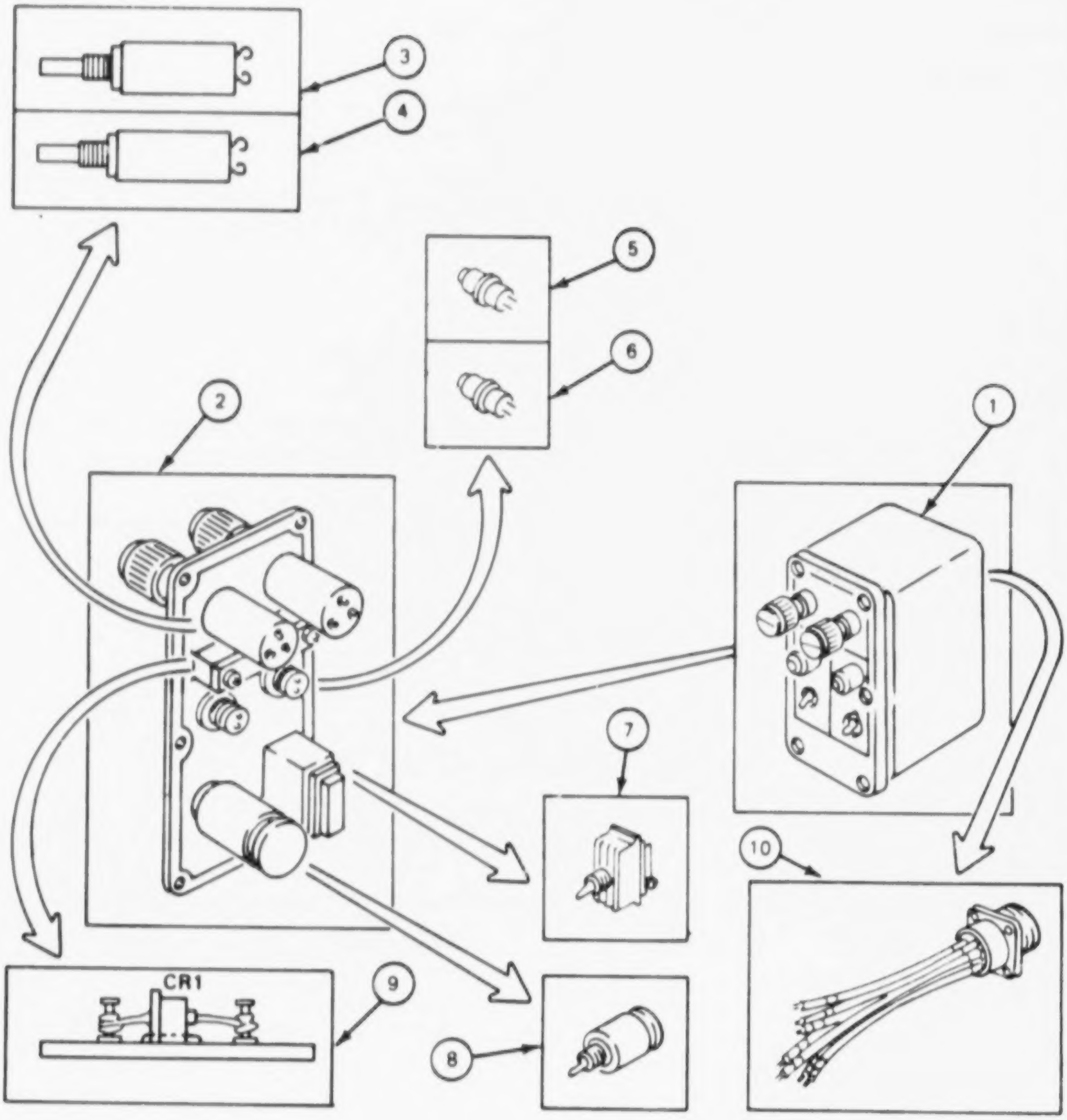
Step	Procedure
1.	Install traverse lower pilot check valve (1) on traverse valve manifold (2) (para 22-9).
2.	Install traverse upper pilot check valve (3) on traverse valve manifold (2) (para 22-7).
3.	Install traverse servovalve (4) on traverse valve manifold (2) (para 22-5).
	NOTE Follow-on Maintenance Action Required: Install traverse stabilizer valve (para 22-3).
	END OF TASK



CHAPTER 23
STABILIZATION CONTROL SELECTOR

23-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Inspection	Test	Removal	Installation	Disassembly	Assembly
1. Stabilization Control Selector	23-2	23-3			23-4	23-5
2. Cover			23-6	23-7		
3. TRAV Variable Resistor			23-8	23-9		
4. ELEV Variable Resistor			23-8	23-9		
5. POWER Lamp and Lens Housing			23-10	23-11		
6. STAB Lamp and Lens Housing			23-10	23-11		
7. POWER Switch			23-12	23-13		
8. STAB Switch			23-14	23-15		
9. Terminal Board			23-16	23-17		
10. Connector			23-18	23-19		


CR1

23-2. STABILIZATION CONTROL SELECTOR INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove cover (para 23-6)

GENERAL INSTRUCTIONS:

NOTE

If any part is bad, order repair part or next higher assembly. Refer to section index (para 23-1) for replacement of parts.

FRAME 1

Step	Procedure
1.	Check electrical connector for bent or broken pins. Check soldered connections for tightness.
2.	Check electrical connections at switches, lamps, adjustable resistors, and terminal board.
3.	Check for loose, bent, or damaged parts.
4.	Check wires for breaks, and burned or worn insulation.
5.	Check case and cover for damage.
	NOTE Follow-on Maintenance Action Required: Install cover (para 23-7).
	END OF TASK

23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE

TEST EQUIPMENT: Multimeter

PERSONNEL: One

REFERENCES: JPG for procedure to use multimeter
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

GENERAL INSTRUCTIONS:

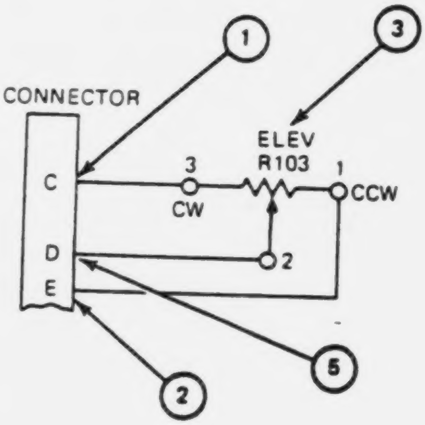
NOTE

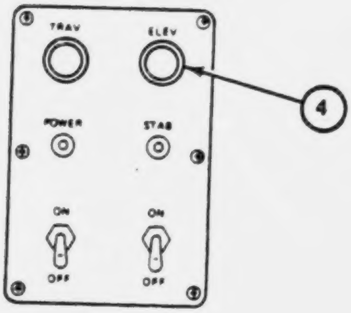
If normal indication is not obtained, remove cover (para 23-6) and do inspection (para 23-2) and continuity check (JPG) on items listed in Probable Fault column. Refer to section index (para 23-1) for replacement of parts.

23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE (CONT)

FRAME 1

Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, measure resistance between connector pins C (1) and E (2) (JPG).	Between 23,750 ohms and 26,250 ohms.	Bad ELEV variable resist (3) or bad wiring
2.	Using hand, turn ELEV control (4) fully clockwise.	. . .	. . .
3.	Using multimeter, measure resistance between connector pins C (1) and D (5) (JPG). Using hand, turn ELEV control (4) from full clockwise to fully counterclockwise. GO TO FRAME 2	Changes from less than 100 ohms to about 25,250 ohms.	Bad ELEV variable resistor (3) or bad wiring

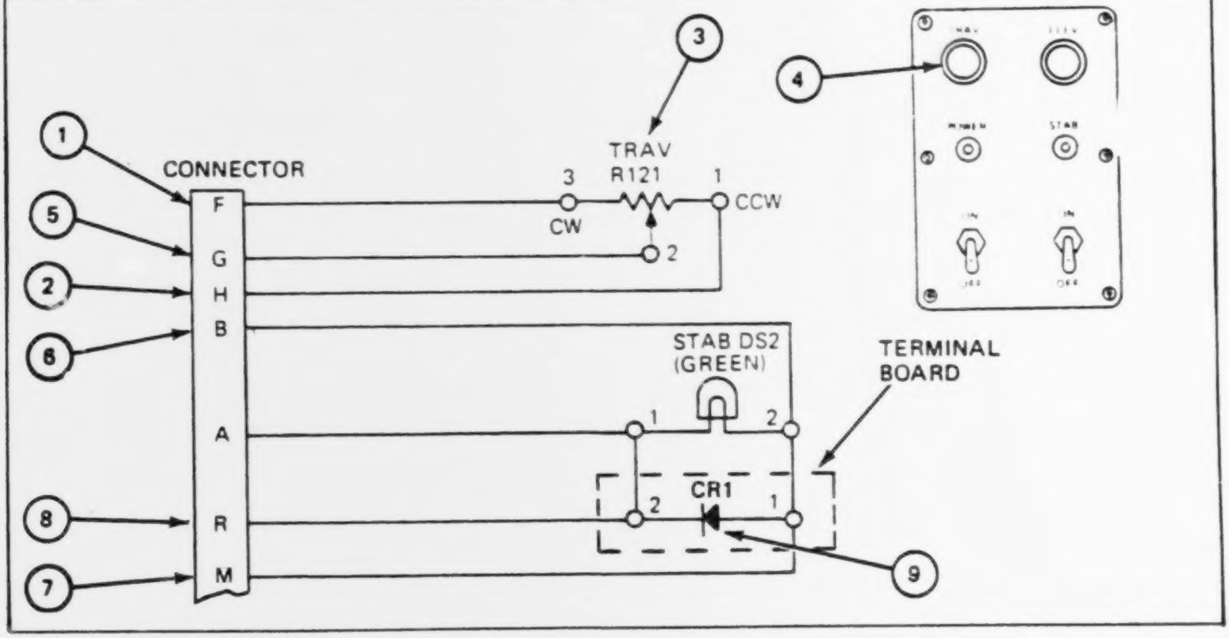

1
3
CONNECTOR
ELEV
R103
3
1
C
CW
CCW
D
2
E
5
2


TRAV
ELEV
POWER
STAB
ON
ON
OFF
OFF
4

23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE (CONT)

FRAME 2

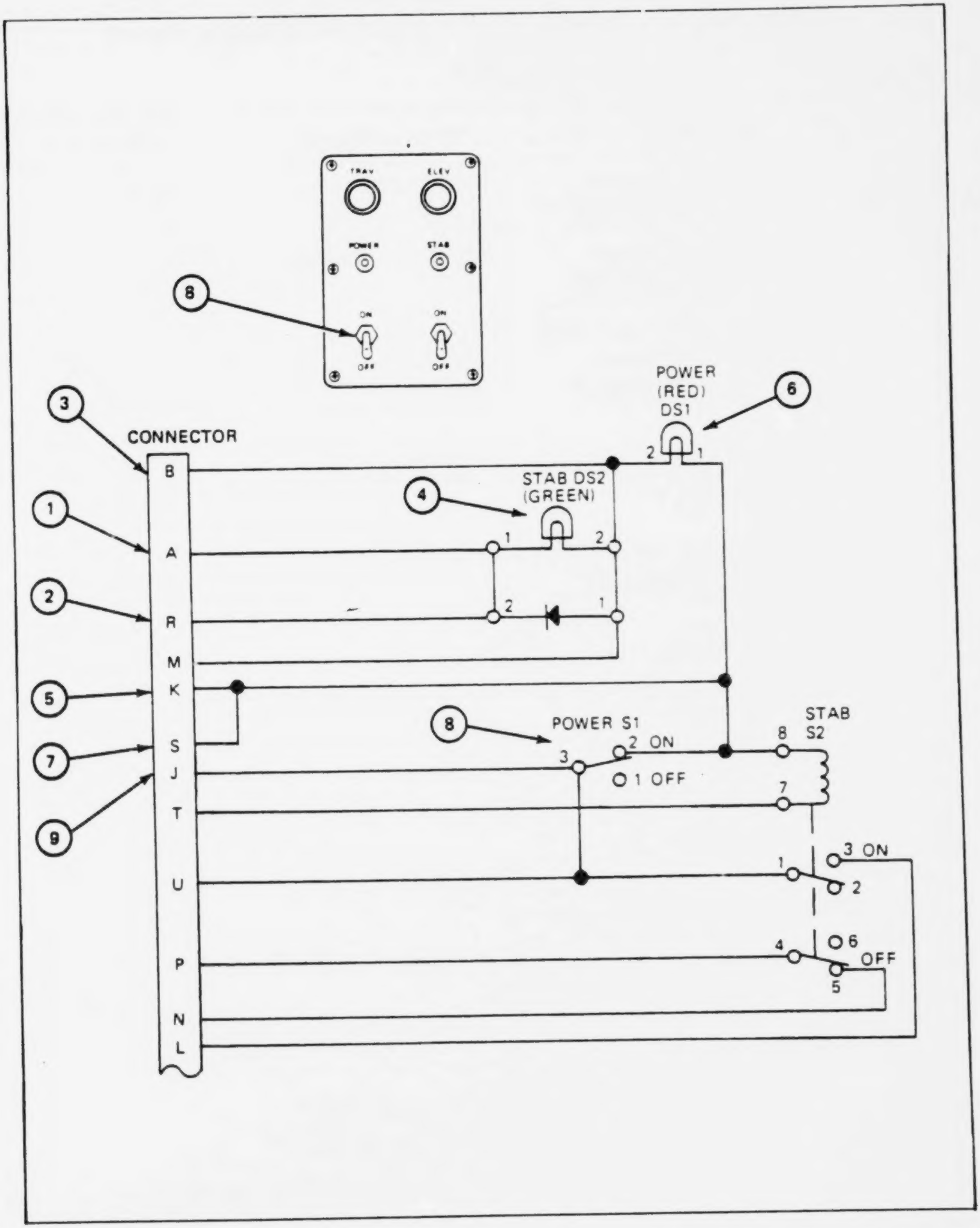
Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, measure resistance between connector pins F (1) and H (2) (JPG).	Between 23,750 ohms and 26,250 ohms.	Bad TRAV variable resistor (3) or bad wiring
2.	Using hand, turn TRAV control (4) fully clockwise.	. . .	. . .
3.	Using multimeter, measure resistance between connector pins F (1) and G (5) (JPG). Using hand, turn TRAV control (4) from fully clockwise to fully counterclockwise.	Changes from less than 100 ohms to about 25,250 ohms.	Bad TRAV variable resistor (3) or bad wiring
4.	Using multimeter, measure resistance between connector pins B (6) and M (7) (JPG).	Less than 2 ohms.	Bad or incorrect wiring
5.	Using multimeter, measure resistance between connector pins M (7) and R (8) and note resistance. Reverse multimeter leads and measure again (JPG). GO TO FRAME 3	One measurement should be at least 10 times larger than the other.	Bad diode (9) or bad wiring



23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE (CONT)

FRAME 3

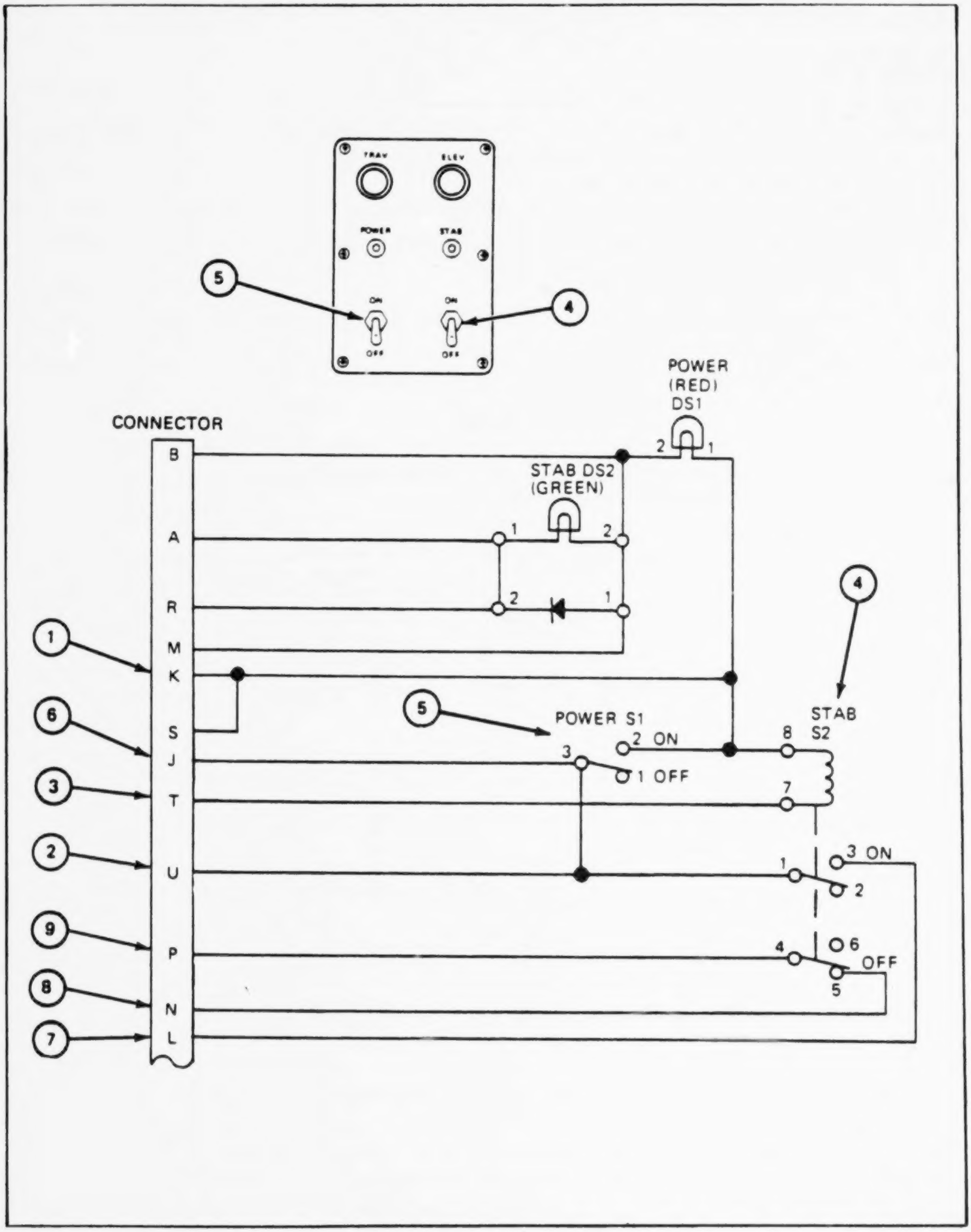
Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, measure resistance between connector pins A (1) and R (2) (JPG).	Less than 2 ohms.	Bad or incorrect wiring
2.	Using multimeter, measure resistance between connector pins B (3) and A (1) (JPG).	Less than 200 ohms.	Bad lamp DS2 (4)
3.	Using multimeter, measure resistance between connector pins B (3) and K (5) (JPG).	Less than 200 ohms	Bad lamp DS1 (6)
4.	Using multimeter, measure resistance between connector pins K (5) and S (7) (JPG).	Less than 2 ohms	Bad or incorrect wiring
5.	Set POWER switch (8) to ON.	. . .	. . .
6.	Using multimeter, measure resistance between connector. pins K (5) and J (9) (JPG). GO TO FRAME 4	Less than 2 ohms	Bad POWER switch S1 (8) or incorrect wiring


TRAV
ELEV
POWER
STAB
ON
OFF
ON
OFF
8
3
CONNECTOR
B
1
A
2
R
M
5
K
7
S
J
9
T
U
P
N
L
POWER
(RED)
DS1
6
2
1
4
STAB DS2
(GREEN)
1
2
2
1
8
POWER S1
3
2 ON
1 OFF
STAB
S2
8
7
1
3 ON
2
4
6
OFF
5

23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE (CONT)

FRAME 4

Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, measure resistance between connector pins K (1) and U (2) (JPG).	Less than 2 ohms	Bad or incorrect wiring
2.	Using multimeter, measure resistance between connector pins K (1) and T (3) (JPG).	Less than 300 ohms	Bad STAB switch S2 (4)
3.	Set POWER switch (5) to OFF.	. . .	. . .
4.	Using multimeter, measure resistance between connector pins K (1) and J (6) (JPG).	Greater than 10 million ohms	Bad POWER switch S1 (5) or incorrect wiring
5.	Using multimeter, measure resistance between connector pins U (2) and L (7) (JPG).	Greater than 10 million ohms	Bad STAB switch S2 (4) or incorrect wiring
6.	Using multimeter, measure resistance between connector pins N (8) and P (9) (JPG).	Less than 2 ohms	Bad STAB switch S2 (4) or incorrect wiring
	GO TO FRAME 5		


TRAV
ELEV
POWER
STAB
ON
OFF
ON
OFF
5
4
POWER
(RED)
DS1
CONNECTOR
B
A
R
M
K
S
J
T
U
P
N
L
STAB DS2
(GREEN)
1
2
2
1
2
1
2
1
4
5
POWER S1
2 ON
3
1 OFF
STAB
S2
8
7
1
3 ON
2
4
6
OFF
5
1
6
3
2
9
8
7

23-3. STABILIZATION CONTROL SELECTOR TEST PROCEDURE (CONT)

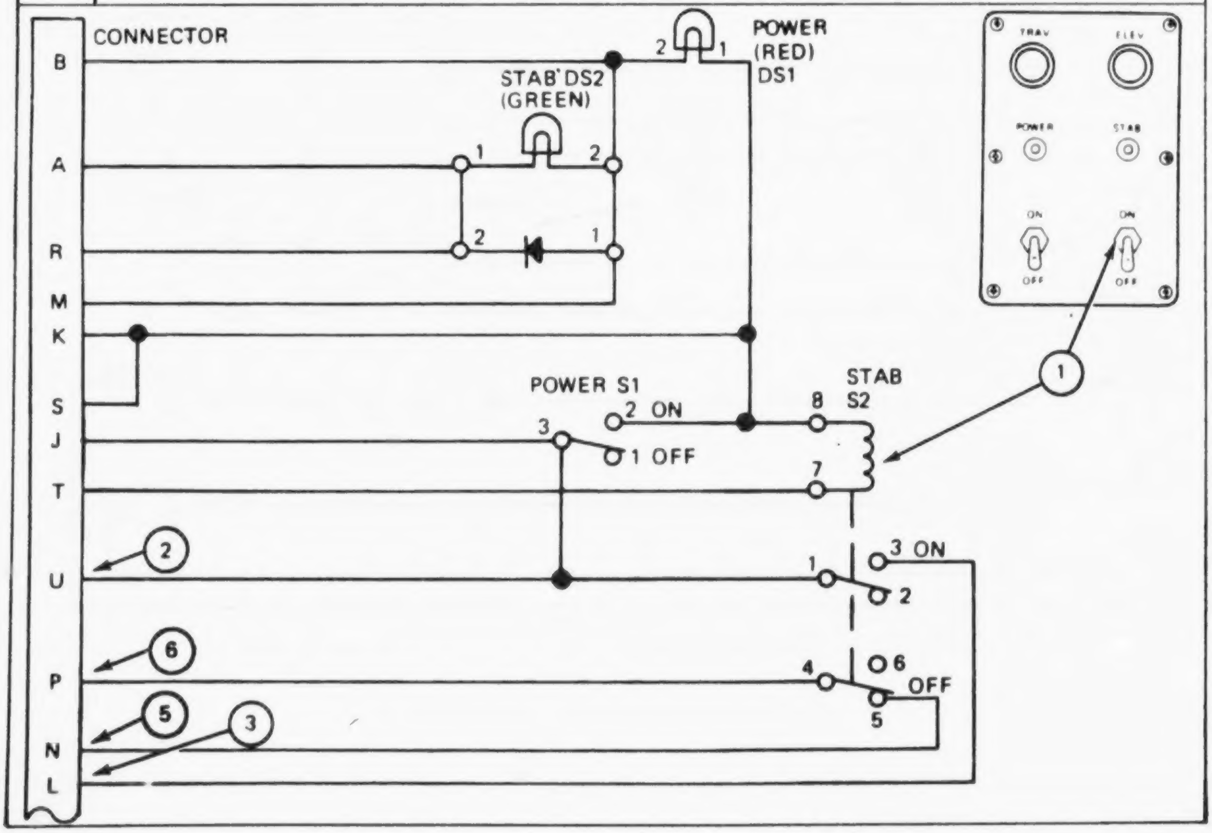
FRAME 5

Step	Procedure	Normal Indication	Probable Fault
1.	Hold STAB switch (1) in ON position.	. . .	. . .
2.	Using multimeter, measure resistance between connector pins U (2) and L (3) (JPG).	Less than 2 ohms	Bad STAB switch S2 (1) or incorrect wiring
3.	Using multimeter, measure resistance between connector pins N (5) and P (6) (JPG).	Greater than 10 million ohms	Bad STAB switch S2 (1) or incorrect wiring

NOTE

If normal indication was obtained in Frames 1 thru 5, stabilization control selector is good.

END OF TASK


CONNECTOR
B
A
R
M
K
S
J
T
U
P
N
L
POWER (RED) DS1
STAB DS2 (GREEN)
POWER S1
2 ON
1 OFF
STAB S2
8
7
3 ON
6 OFF
TRAV
ELEV
POWER
STAB
ON
OFF
①
②
③
⑤
⑥

23-4. STABILIZATION CONTROL SELECTOR DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)

FRAME 1

Step	Procedure
1.	Remove cover (para 23-6).
2.	Remove TRAV variable resistor (para 23-8).
3.	Remove ELEV variable resistor (para 23-8).
4.	Remove POWER lamp and lens housing (para 23-10).
5.	Remove STAB lamp and lens housing (para 23-10).
6.	Remove POWER switch (para 23-12).
7.	Remove STAB switch (para 23-14).
8.	Remove terminal board (para 23-16).
9.	Remove connector (para 23-18).
	END OF TASK

23-5. STABILIZATION CONTROL SELECTOR ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Install connector (para 23-19).
2.	Install terminal board (para 23-17).
3.	Install STAB switch (para 23-15).
4.	Install POWER switch (para 23-13).
5.	Install STAB lamp and lens (para 23-11).
6.	Install POWER lamp and lens (para 23-11).
7.	Install ELEV variable resistor (para 23-9).
8.	Install TRAV variable resistor (para 23-9).
9.	Install cover (para 23-7).
	NOTE Follow-on Maintenance Action Required: Test stabilization control selector (para 23-3).
	END OF TASK

23-6. COVER REMOVAL PROCEDURE

TOOLS. No. 2 cross tip screwdriver (Phillips)

PERSONNEL: One

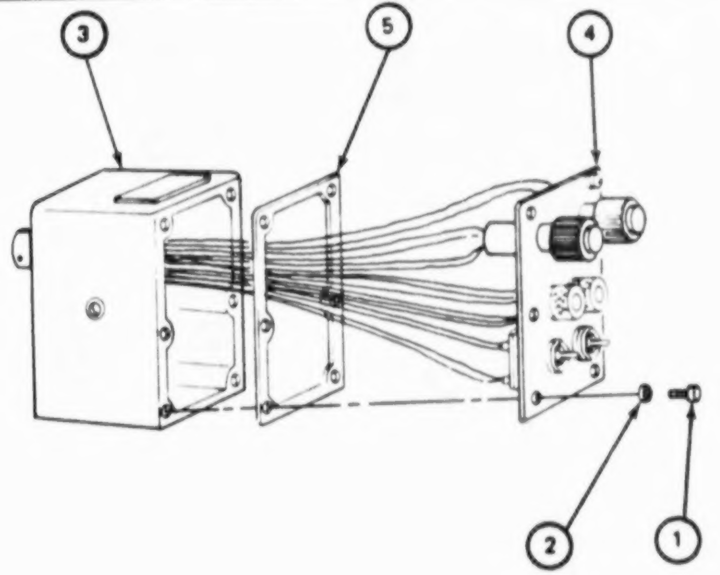
REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove six screws (1) and six lockwashers (2) from control selector case (3).
	CAUTION Be careful not to tear gasket when doing step 2.
2.	Pull cover (4) with gasket (5) away from case (3) as far as you can without putting strain on wires.
	END OF TASK



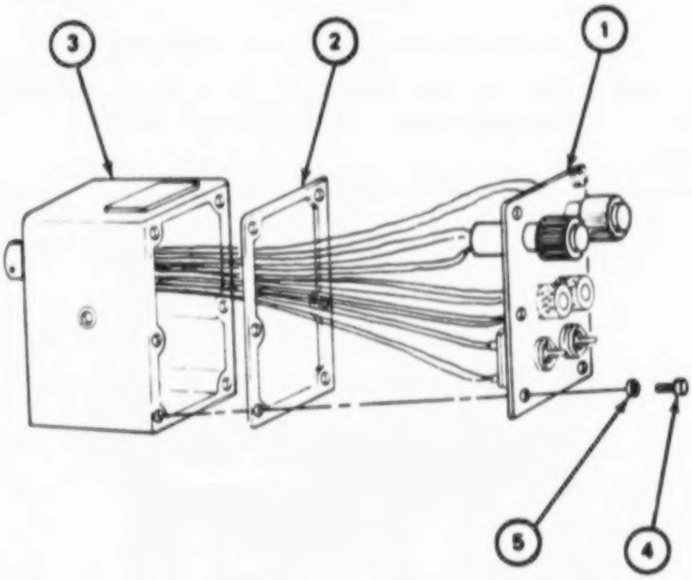
23-7. COVER INSTALLATION PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Put cover (1) with gasket (2) on case (3).
2.	Put six screws (4) with six lockwashers (5) through cover (1) and gasket (2) into case (3).
3.	Using screwdriver, tighten six screws (4).
	END OF TASK



23-8. TRAV OR ELEV VARIABLE RESISTOR REMOVAL PROCEDURE

TOOLS: 5/64" socket head screw key (Allen wrench)
1/2" open end wrench
9/16" open end wrench
Soldering iron
Small knife

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Remove cover (para 23-6)
Test stabilization control selector (para 23-3)

GENERAL INSTRUCTIONS:

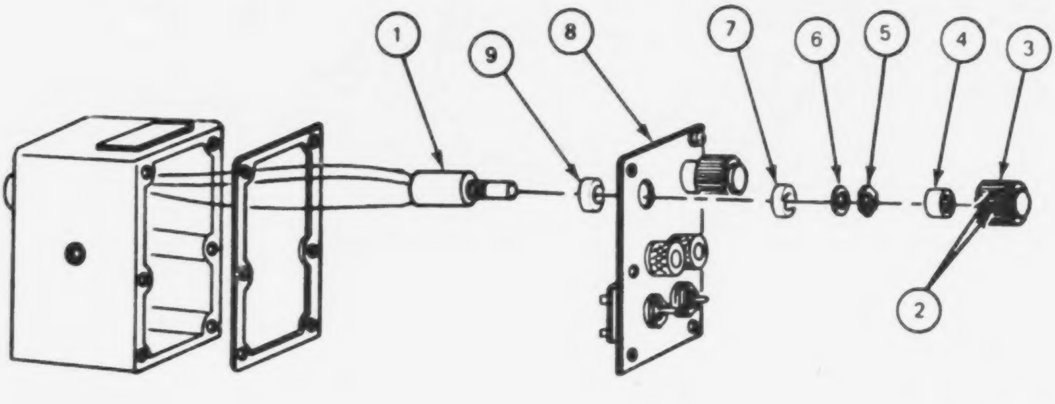
NOTE

This procedure can be used to remove either TRAV or ELEV variable resistor.

23-8. TRAV OR ELEV VARIABLE RESISTOR REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Tag each wire connected to variable resistor (1) terminals (JPG). **NOTE** Variable resistor (1) has three connecting terminals. Each terminal has number that can be seen at base of each terminal.
2.	Using small knife, cut insulation tubing off end of each wire.
3.	Using soldering iron, unsolder tagged wires from variable resistor (1) (JPG).
4.	Using Allen wrench, loosen but do not remove, two setscrews (2) in control knob (3).
5.	Remove knob (3).
6.	Using 1/2" wrench, remove shaft lock (4) from variable resistor (1).
7.	Using 9/16" wrench, remove nut (5), lockwasher (6), and spacer (7).
8.	Remove variable resistor (1) from cover (8).
9.	Remove preformed packing (9) from variable resistor (1).
	END OF TASK



23-9. TRAV OR ELEV VARIABLE RESISTOR INSTALLATION PROCEDURE

TOOLS: 5/64" socket head screw key (Allen wrench)
1/2" open end wrench
9/16" open end wrench
Soldering iron
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Insulating tubing (item 39, App. A)
Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

GENERAL INSTRUCTIONS:

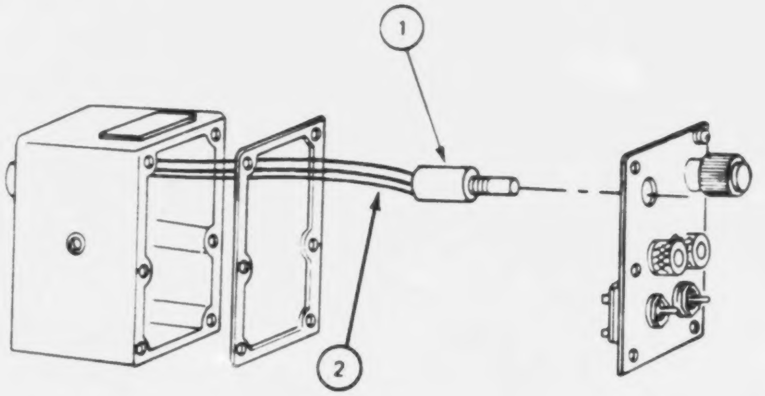
NOTE

This procedure can be used to install either TRAV or ELEV variable resistor.

23-9. TRAV OR ELEV VARIABLE RESISTOR INSTALLATION PROCEDURE (CONT)

FRAME 1

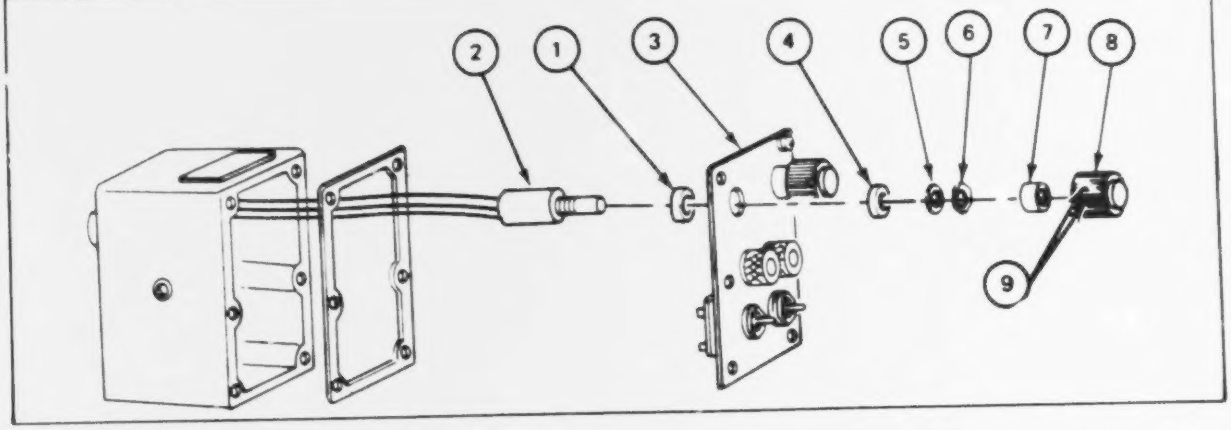
Step	Procedure
1.	Put 1" length of insulation tubing on each wire to be soldered to terminals of variable resistor (1).
2.	Slide insulation tubing about 2" away from end of each wire.
3.	Using soldering iron, solder three tagged wires (2) to three terminals of variable resistor (1) (JPG).
4.	Remove tags from wires.
5.	Slide insulation tubing over soldered connections.
6.	Using heat gun, heat insulation tubing until it begins to shrink (JPG).
	GO TO FRAME 2



23-9. TRAV OR ELEV VARIABLE RESISTOR INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Put preformed packing (1) on variable resistor (2).
2.	Put variable resistor (2) in cover (3).
3.	Put spacer (4), lockwasher (5) and nut (6) on variable resistor (2).
	NOTE Hold resistor with fingers while tightening to avoid damage to wires.
4.	Using 9/16" wrench, tighten nut (6).
5.	Using 1/2" wrench, put shaft lock (7) on variable resistor (2).
6.	Put knob (8) on shaft of variable resistor (2).
7.	Using Allen wrench, tighten two setscrews (9) in knob (8).
	NOTE Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following. Follow-on Maintenance Action Required: Install cover (para 23-7). Test stabilization control selector (para 23-3).
	END OF TASK



23-10. POWER OR STAB LAMP AND LENS HOUSING REMOVAL PROCEDURE

TOOLS: 9/16" combination wrench
Soldering iron
Small knife

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
Remove lamps
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)
Remove cover (para 23-6)

GENERAL INSTRUCTIONS:

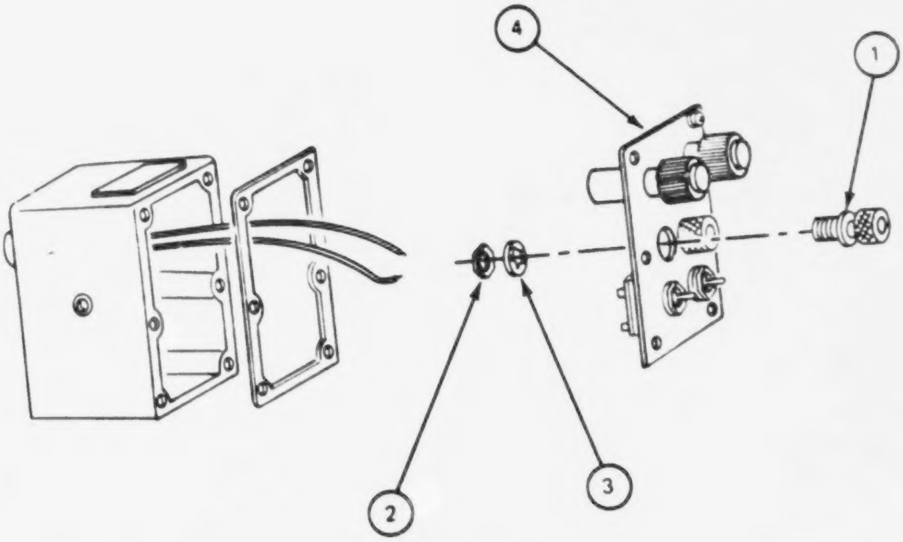
NOTE

This procedure can be used to remove either POWER lamp and lens (red) housing or STAB lamp and lens (green) housing.

23-10. POWER OR STAB LAMP AND LENS HOUSING REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Tag each wire connected to lamp and lens housing (1) terminals (JPG).
2.	Using small knife, cut insulation tubing off end of each wire.
3.	Using soldering iron, unsolder tagged wires from terminals of lamp and lens housing (1) (JPG).
4.	Using wrench, remove nut (2) and lockwasher (3) from lamp and lens housing (1).
5.	Remove lamp and lens housing (1) from cover (4) (JPG).
	END OF TASK



23-11. POWER OR STAB LAMP AND LENS HOUSING INSTALLATION PROCEDURE

TOOLS: 9/16 combination wrench
Soldering iron
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Insulation tubing (item 39, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

GENERAL INSTRUCTIONS:

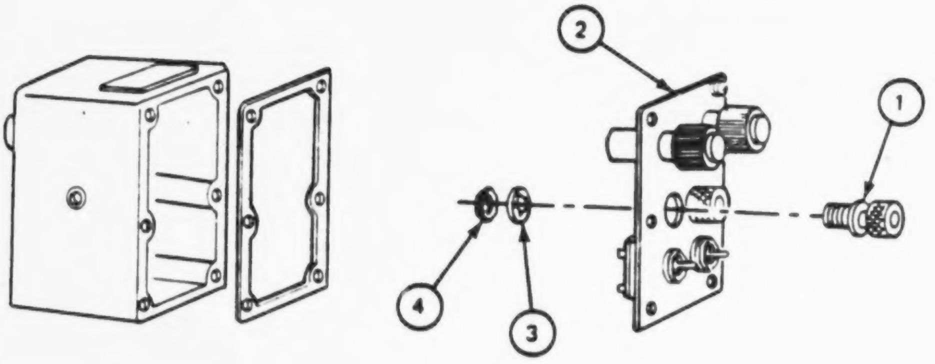
NOTE

This procedure can be used to install either POWER lamp and lens housing or STAB lamp and lens housing.

23-11. POWER OR STAB LAMP AND LENS HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 1

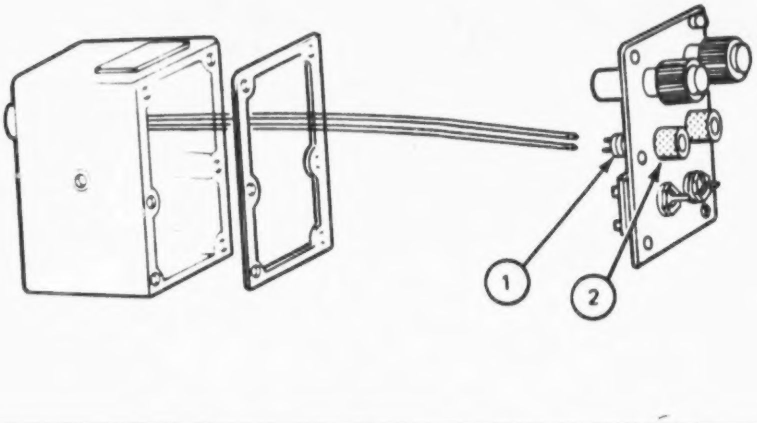
Step	Procedure
	NOTE POWER lamp has red lens; STAB lamp has green lens.
1.	Put lamp and lens (1) into cover (2).
2.	Put lockwasher (3) and nut (4) on lamp and lens housing (1).
3.	Using wrench, tighten nut (4).
	GO TO FRAME 2



23-11. POWER OR STAB LAMP AND LENS HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Put 1" length of insulation tubing on each wire to be soldered to lamp and lens terminals (1).
2.	Slide insulation tubing about 2" away from ends of wires.
3.	Using soldering iron, solder tagged wires to terminals (1) on lamp and lens housing (2) (JPG).
4.	Remove tags from wires.
5.	Slide insulation tubing over soldered connections.
6.	Using heat gun, heat insulation tubing until tubing begins to shrink (JPG).
	NOTE Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following. Follow-on Maintenance Action Required: Install cover (para 23-7). Test stabilization control selector (para 23-3).
	END OF TASK



23-12. POWER SWITCH REMOVAL PROCEDURE

TOOLS: 9/16" combination wrench
Soldering iron
Small knife

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

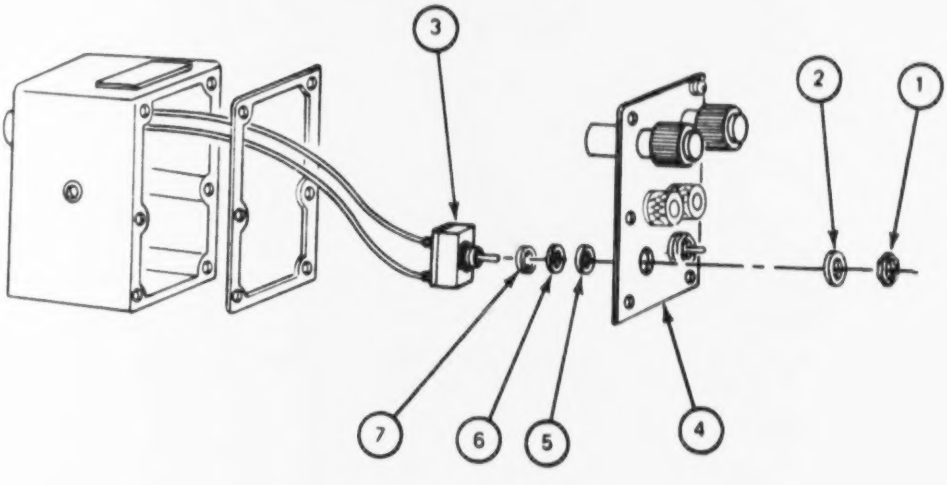
EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)
Remove cover (para 23-6)

23-12. POWER SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using wrench, remove nut (1) and lockwasher (2) from POWER switch (3).
2.	Remove POWER switch (3) from cover (4).
3.	Remove seal (5), key washer (6), and nut (7) from POWER switch (3).
4.	Tag each wire connected to terminals of POWER switch (3) (JPG).
5.	Using small knife, cut insulation tubing off end of each wire.
6.	Using soldering iron, unsolder tagged wires from POWER switch (3) (JPG).
	END OF TASK



23-13. POWER SWITCH INSTALLATION PROCEDURE

TOOLS: 9/16" combination wrench
Soldering iron
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Seal
Insulation tubing (item 39, App. A)

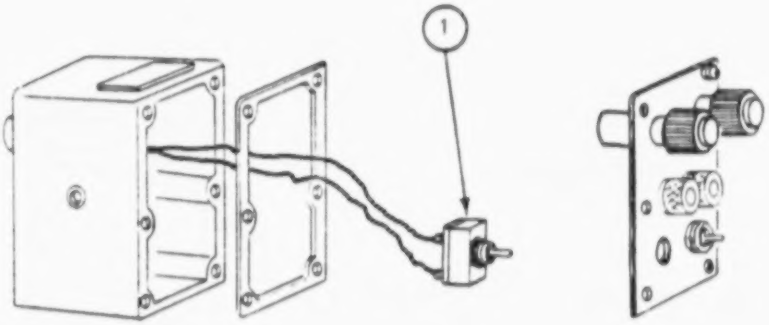
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

23-13. POWER SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 1

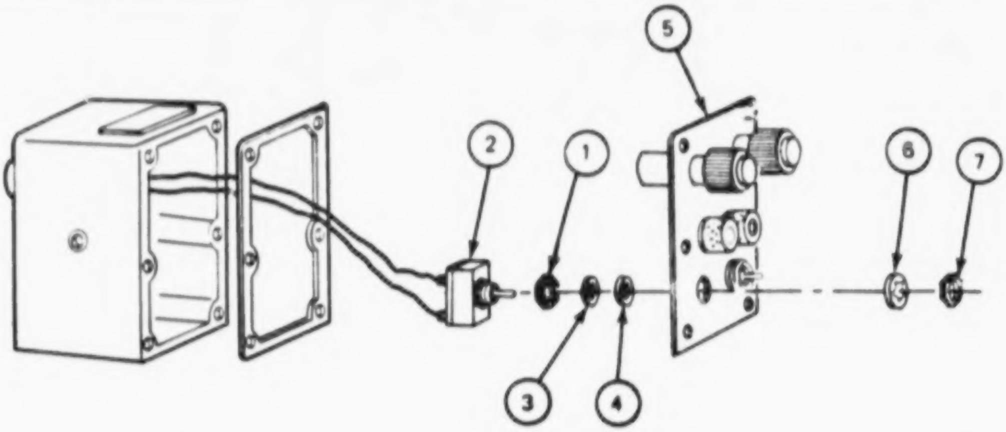
Step	Procedure
1.	Put 1" length of insulation tubing on each wire to be soldered to POWER switch (1).
2.	Slide insulation tubing about 2" away from end of wire.
3.	Using soldering iron, solder tagged wires to terminals on POWER switch (1) (JPG).
4.	Remove tags from wires.
5.	Slide insulation tubing over soldered connections.
6.	Using heat gun, heat insulation tubing until tubing begins to shrink (JPG).
	GO TO FRAME 2



23-13. POWER SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using wrench, put nut (1) on switch (2).
2.	Put key washer (3), and seal (4) on switch (2).
	NOTE Key washer (3) should be installed with bent prong inserted in small hole in back of cover (5).
3.	Put switch (2) into cover (5).
4.	Put lockwasher (6) on switch (2).
5.	Put nut (7) on switch (2).
6.	Using wrench, tighten nut (7).
	NOTE Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following. Follow-on Maintenance Action Required: Install cover (para 23-7). Test stabilization control selector (para 23-3).
	END OF TASK



23-14. STAB SWITCH REMOVAL PROCEDURE

TOOLS: 5/8" combination wrench
Soldering iron
Small knife

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

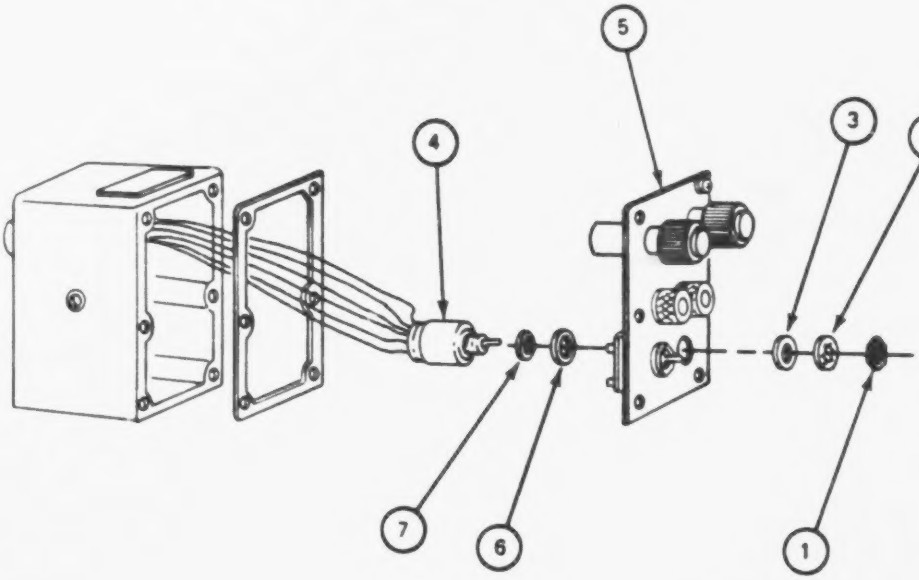
EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)
Remove cover (para 23-6)

23-14. STAB SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using wrench, remove nut (1), lockwasher (2), and key washer (3) from STAB switch (4).
2.	Remove STAB switch (4) from cover (5).
3.	Remove spacer (6) and seal (7) from STAB switch (4).
4.	Tag each wire connected to terminals of STAB switch (4) (JPG).
5.	Using small knife, cut insulation tubing off end of each wire.
6.	Using soldering iron, unsolder tagged wires from STAB switch (4) (JPG).
	END OF TASK



23-15. STAB SWITCH INSTALLATION PROCEDURE

TOOLS: 5/8" combination wrench
Soldering iron
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Insulated sleeving (item 39, App. A)
Solder (item 31, App. A)
Packing

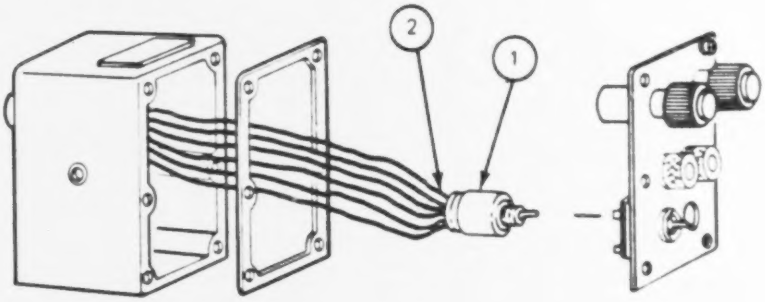
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

23-15. STAB SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 1

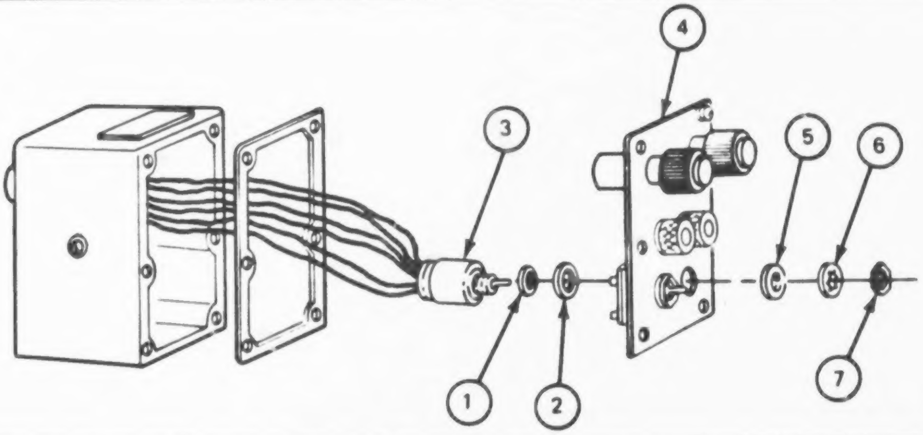
Step	Procedure
1.	Put 1" length of insulation tubing on each wire to be soldered to STAB switch (1).
2.	Slide insulation tubing about 2" away from end of wires.
3.	Using soldering iron, solder tagged wires (2) to terminals on STAB switch (1) (JPG).
4.	Remove tags from wires.
5.	Slide insulation tubing over soldered connections.
6.	Using heat gun, heat insulation tubing until tubing begins to shrink (JPG).
	GO TO FRAME 2



23-15. STAB SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 2

Step	Procedure
	NOTE In step 1, make sure seal (1) fits inside of spacer (2).
1.	Put seal (1) and spacer (2) on STAB switch (3).
2.	Put STAB switch (3) in mounting hole of cover (4).
	NOTE Key washer (5) should be installed with bent prong inserted in small hole on front of cover (4).
3.	Put key washer (5) and lockwasher (6) on STAB switch (3).
4.	Put nut (7) on STAB switch (3).
	NOTE Hold switch (3) with fingers while tightening to avoid damage to wires.
5.	Using wrench, tighten nut (7).
	NOTE Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following. Follow-on Maintenance Action Required: Install cover (para 23-7). Test stabilization control selector (para 23-3).
	END OF TASK



23-16. TERMINAL BOARD REMOVAL PROCEDURE

TOOLS: 1/4" combination wrench
Soldering iron
Small knife
No. 1 cross tip screwdriver (Phillips)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

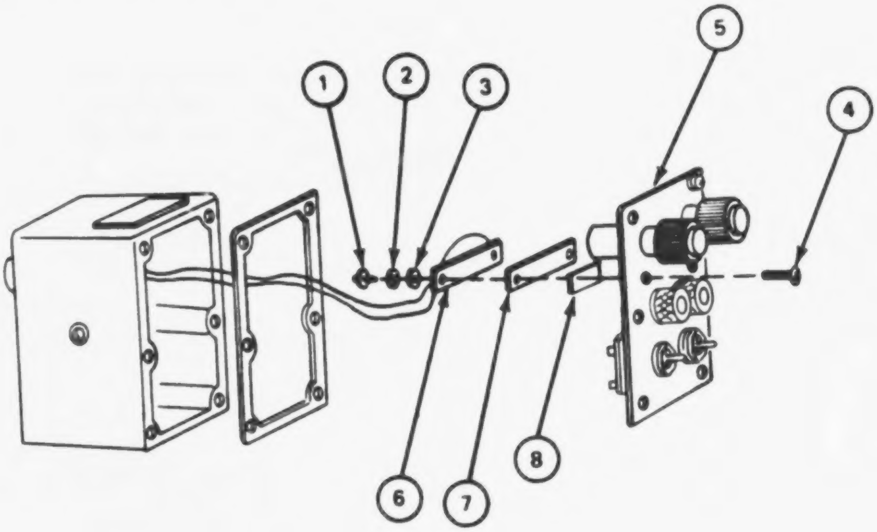
EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)
Remove cover (para 23-6)

23-16. TERMINAL BOARD REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver and wrench, remove two nuts (1), two lockwashers (2), and two flat washers (3) from two screws (4).
2.	Remove two screws (4) from cover (5).
3.	Remove terminal board (6), terminal board insulator (7), and spacer (8) from cover (5).
4.	Tag each wire connected to terminals of terminal board (6) (JPG).
5.	Using small knife, cut insulation tubing off end of each wire.
6.	Using soldering iron, unsolder tagged wires from terminal board (6) (JPG).
	END OF TASK



23-17. TERMINAL BOARD INSTALLATION PROCEDURE

TOOLS: 1/4" combination wrench
Soldering iron
No. 1 cross tip screwdriver (Phillips)

SUPPLIES: Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedure to use soldering iron

23-17. TERMINAL BOARD INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using soldering iron, solder tagged wires to terminals on terminal board (1) (JPG).
2.	Remove tags from wires.
3.	Put terminal board (1), insulator (2), and spacer (3) on backside of cover (4).
4.	Put two screws (5) through cover (4), spacer (3), insulator (2), and terminal board (1).
5.	Put two flat washers (6), two lockwashers (7), and two nuts (8) on two screws (5).
6.	Using screwdriver and wrench, tighten two screws (5) and two nuts (8).

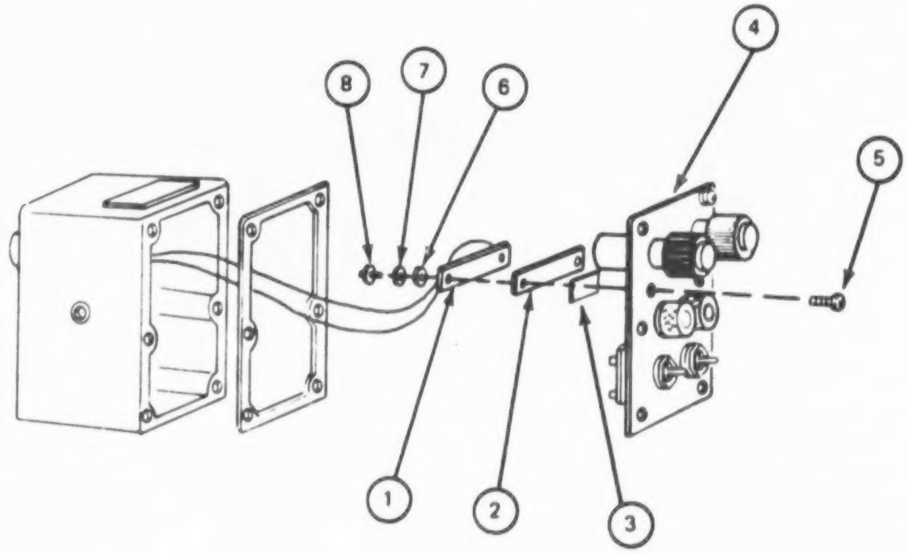
NOTE

Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following.

Follow-on Maintenance Action Required:

Install cover (para 23-7).
Test stabilization control selector (para 23-3).

END OF TASK



23-18. CONNECTOR REMOVAL PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)
Soldering iron
Small knife

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
TM 9-2350-257-20-2-3 for procedure to remove stabilization control selector

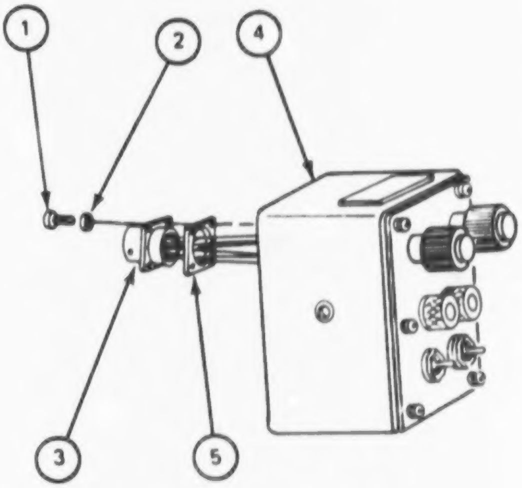
EQUIPMENT CONDITION: Stabilization control selector removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization control selector (para 23-3)

23-18. CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) from connector (3).
2.	Pull out connector (3) from case (4) as far as you can without putting strain on wires.
3.	Slide string or plastic harness ties away from connector (3) so that tags can be put on connector wires.
4.	Tag connector (3) wires (JPG).
5.	Using small knife, cut insulation tubing off end of each wire.
6.	Using soldering iron, unsolder wires from connector (3) (JPG).
7.	Remove connector (3) and gasket (5).
	END OF TASK



23-19. CONNECTOR INSTALLATION PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)
Soldering iron
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Insulation tubing (item 39, App. A)
Solder (item 31, App. A)

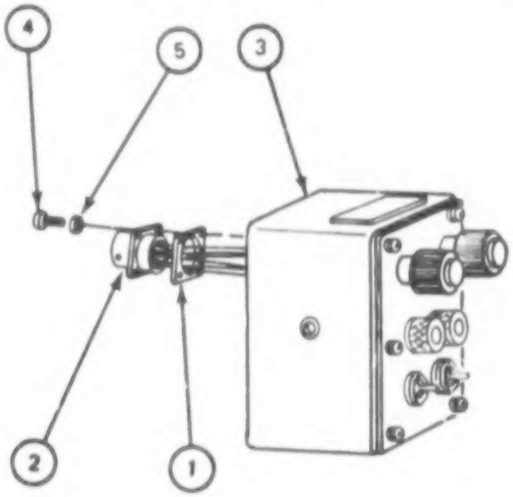
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

23-19. CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Slide 1" length of insulation tubing on each connector wire, so that ends of bare wires show.
2.	Put wire harness wires through gasket (1).
3.	Using soldering iron, solder wires to connector (2) pins as shown on wire tags (JPG).
4.	Slide insulation tubing on each wire over soldered connection.
5.	Remove tags from wires.
6.	Using heat gun, heat insulation tubing until tubing begins to shrink (JPG).
7.	Put connector (2) with gasket (1) into mounting hole in case (3).
8.	Using screwdriver, attach connector (2) and gasket (1) to case (3) with four screws (4) and four washers (5).
	NOTE Do following only if this completes maintenance of stabilization control selector. If more maintenance must be done, omit following: Follow-on Maintenance Action Required: Test stabilization control selector (para 23-3). END OF TASK

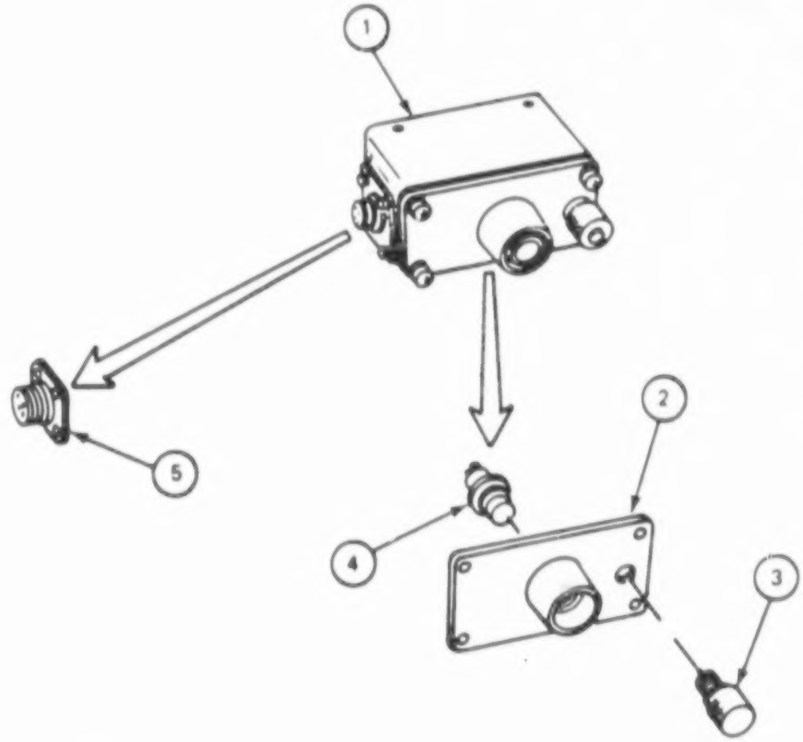


CHAPTER 24

STABILIZATION SHUT-OFF BOX

24-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Test	Removal	Tasks Installation	Disassembly	Assembly
1. Stabilization Shut-Off Box	24-2	. . .	. . .	24-3	24-4
2. Cover	. . .	24-5	24-6	. . .	. . .
3. Lamp Housing	. . .	24-7	24-8	. . .	. . .
4. Switch	. . .	24-9	24-10	. . .	. . .
5. Electrical Connector	. . .	24-11	24-12	. . .	. . .



24-2. STABILIZATION SHUT-OFF BOX TEST PROCEDURE

TEST EQUIPMENT: Multimeter
0-36 VDC power supply
Power supply leads (two)

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedures to:
  Remove stabilization shut-off box
  Install lamp
JPG for procedures to:
  Use multimeter
  Use power supply

EQUIPMENT CONDITION: Stabilization shut-off box removed (TM-20-2-3)
Good lamp installed (TM-20-2-3)

GENERAL INSTRUCTIONS: If normal indication is not obtained, remove cover (para 24-5) and do continuity check on items listed in Probable Fault column (JPG). Refer to section index (para 24-1) for replacement of bad part.

24-2. STABILIZATION SHUT-OFF BOX TEST PROCEDURE (CONT)

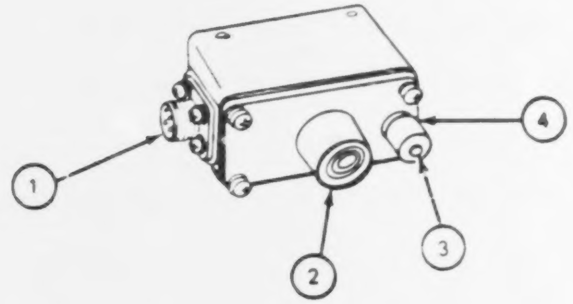
FRAME 1

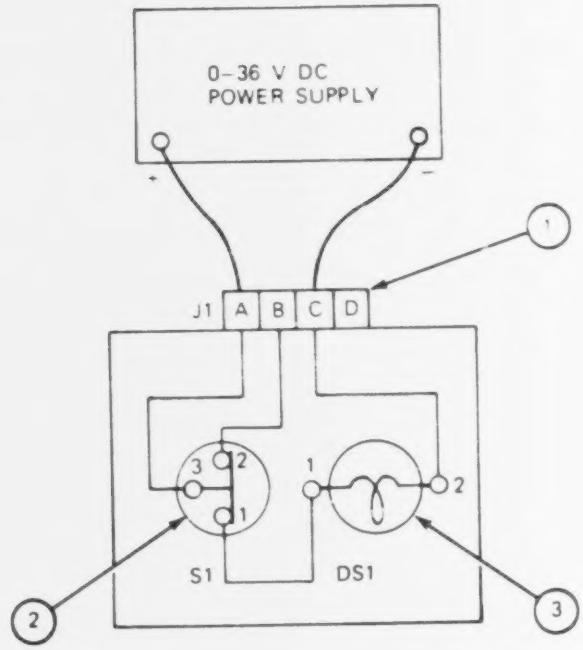
Step	Procedure	Normal Indication	Probable Faults
1.	Connect positive lead of power supply to connector (1) pin A. Connect negative lead to connector (1) pin C (JPG).	. . .	. . .
2.	Turn on power supply. Adjust voltage to 24 vdc (JPG).	. . .	. . .
3.	Switch (2) not pressed in.	Lamp (3) lights	Switch (2) Lamp housing (4) Connector (1)
4.	Press in switch (2).	Lamp (3) does not light	Switch (2)
5.	Adjust voltage to 0 vdc. Turn off power supply (JPG).	. . .	. . .
6.	Disconnect power supply leads (JPG).	. . .	. . .
7.	Using multimeter, check for continuity between connector (1) pins A and B with switch (2) not pressed in (JPG).	Less than 2 ohms	Switch (2) Connector (1)
8.	Using multimeter, check for continuity between connector (1) pins A and B with switch (2) pressed in (JPG).	Greater than 10 million ohms	Switch (2)

NOTE

If normal indication was obtained in steps 1 thru 8, part is good.

END OF TASK




0-36 V DC
POWER SUPPLY
+
–
1
J1
A
B
C
D
3
2
1
1
2
S1
DS1
2
3

24-3. STABILIZATION SHUT-OFF BOX DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove stabilization shut-off box

EQUIPMENT CONDITION: Stabilization shut-off box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization shut-off box (para 24-2)

FRAME 1

Step	Procedure
1.	Remove cover (para 24-5).
2.	Remove lamp housing (para 24-7).
3.	Remove switch (para 24-9).
4.	Remove electrical connector (para 24-11).
	END OF TASK

24-4. STABILIZATION SHUT-OFF BOX ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Install electrical connector (para 24-12).
2.	Install switch (para 24-10).
3.	Install lamp housing (para 24-8).
4.	Install cover (para 24-6).
	NOTE Follow-on Maintenance Action Required: Test stabilization shut-off box (para 24-2).
	END OF TASK

24-5. COVER REMOVAL PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove stabilization shut-off box

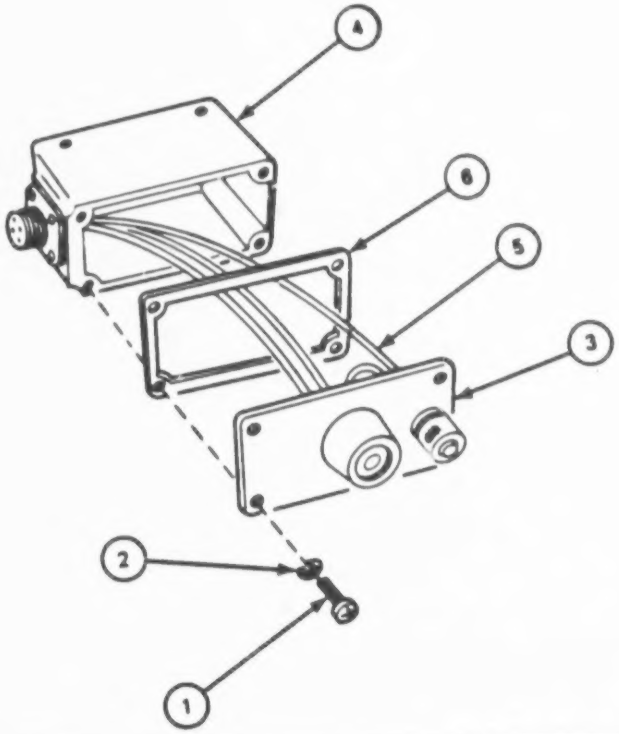
EQUIPMENT CONDITION: Stabilization shut-off box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test stabilization shut-off box (para 24-2)

24-5. COVER REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) that attach cover (3) to case (4).
2.	Lift cover (3), with wiring (5) attached, so you can get to parts inside case (4).
3.	Remove gasket (6) by sliding over cover (3).
	NOTE If cover is good, your task is ended. If cover is bad, do steps 4 and 5.
4.	Remove lamp housing (para 24-7).
5.	Remove switch (para 24-9).
	END OF TASK



24-6. COVER INSTALLATION PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)

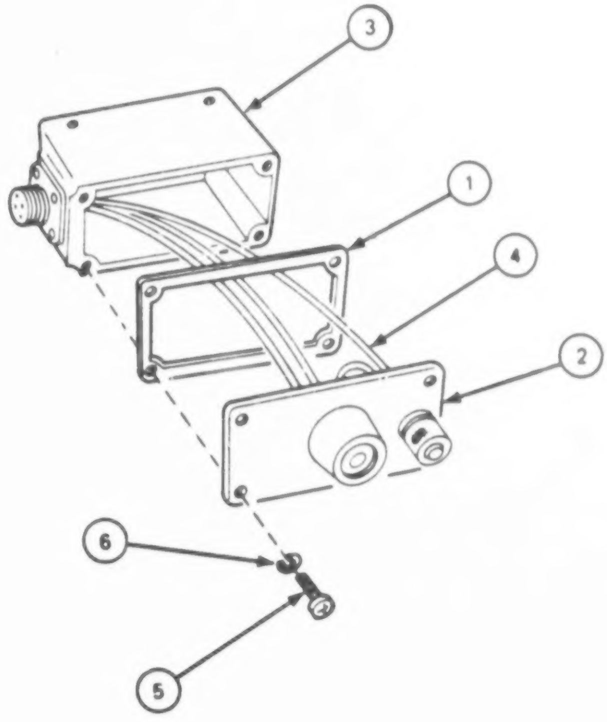
SUPPLIES: Gasket

PERSONNEL: One

24-6. COVER INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
	NOTE Do steps 1 and 2 if cover was replaced.
1.	Install switch (para 24-10).
2.	Install lamp housing (para 24-8).
3.	Slide new gasket (1) over cover (2).
4.	Carefully put cover (2) and gasket (1) on case (3) while pushing wires (4) inside case.
5.	Using screwdriver, attach cover (2) to case (3) with four screws (5) and four lockwashers (6).
	END OF TASK



24-7. LAMP HOUSING REMOVAL PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench
Knife

PERSONNEL: One

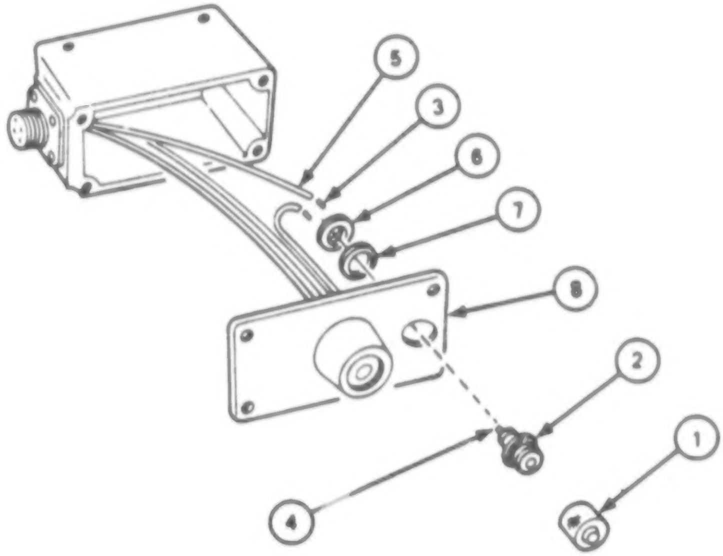
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
Remove lamps

PRELIMINARY PROCEDURES: Test stabilization shug-off box (para 24-2)
Remove cover (para 24-5)

24-7. LAMP HOUSING REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using hand, unscrew lens cap (1) from lamp housing (2). Remove lens cap.
2.	Using knife, remove tubing insulation (3) from two terminals (4) on lamp housing (2).
3.	Tag two wires (5) connected to terminals (4) (JPG).
4.	Using soldering iron, unsolder two electrical wires (5) from terminals (4) (JPG).
5.	Using wrench, remove nut (6) and lockwasher (7) that attach lamp housing (2) to cover (8). Remove lamp housing.
6.	Remove lamp from lamp housing (2) (JPG).
	END OF TASK



24-8. LAMP HOUSING INSTALLATION PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 39, App. A)

PERSONNEL: One

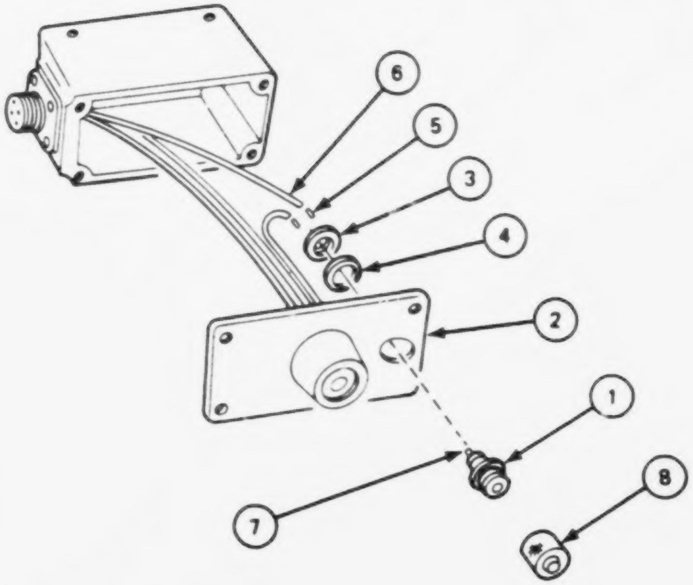
REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun
Install lamps

PRELIMINARY PROCEDURES: Remove cover (para 24-5)
Install switch (para 24-10)

24-8. LAMP HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using wrench, attach lamp housing (1) to cover (2) with nut (3) and lockwasher (4).
2.	Put 1/2" long piece of tubing insulation (5) over each of two wires (6) to be soldered to lamp housing (1).
3.	Using soldering iron, solder two tagged wires (6) to proper number terminal (7) on lamp housing (1) (JPG).
4.	Remove masking tape tags from two wires (6).
5.	Put tubing insulation (5) over each of two soldered terminal connections (7).
6.	Using heat gun, shrink tubing insulation (5) (JPG).
7.	Using hand, put lamp in lens cap (8) and screw lens cap to lamp housing (1) (JPG).
	NOTE
	Follow-on Maintenance Action Required:
	Test stabilization shut-off box (para 24-2). Install cover (para 24-6).
	END OF TASK



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24-9. SWITCH REMOVAL PROCEDURE

TOOLS: Soldering iron
3/4" socket (3/8" drive)
3/8" drive ratchet
Knife

PERSONNEL: One

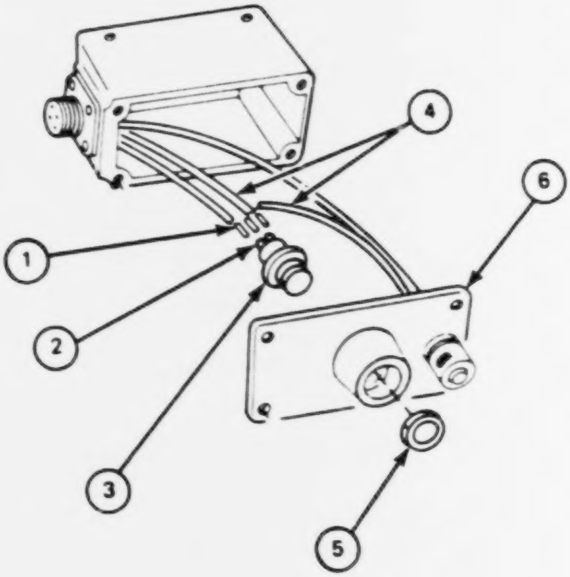
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test stabilization shut-off box (para 24-2)
Remove cover (para 24-5)

24-9. SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using knife, remove insulation (1) from three terminals (2) on switch (3).
2.	Tag each of three wires (4) connected to terminals (2) (JPG).
3.	Using soldering iron, unsolder three electrical wires (4) from terminals (2) (JPG).
4.	Using socket wrench, remove boot (5) that attaches switch (3) to cover (6). Remove switch.
	END OF TASK



24-10. SWITCH INSTALLATION PROCEDURE

TOOLS: Soldering iron
3/4" socket (3/8" drive)
3/8" drive ratchet
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 39, App. A)
Masking tape (item 36, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

PRELIMINARY PROCEDURES: Install electrical connector on stabilization shut-off box (para 24-12)
Remove cover (para 24-5)

24-10. SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 1

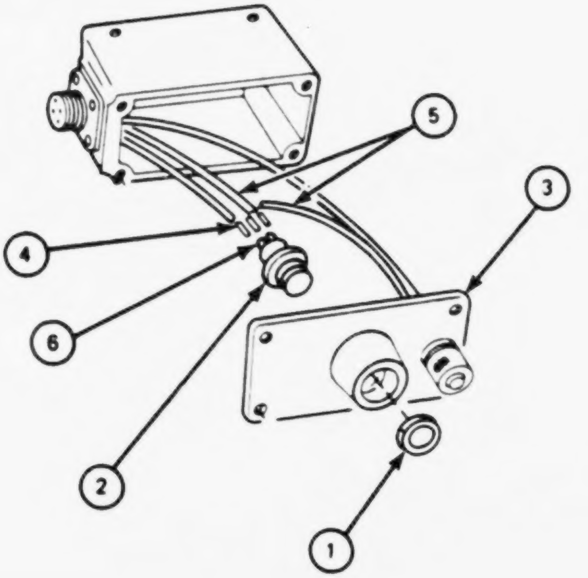
Step	Procedure
1.	Using socket wrench, screw on boot (1) to attach switch (2) to cover (3).
2.	Put 1/2" long piece of tubing insulation (4) over each of three wires (5) to be soldered to switch (2).
3.	Using soldering iron, solder three tagged wires (5) to proper number terminal (6) on switch (2) (JPG).
4.	Remove masking tape tags from three wires (5).
5.	Put tubing insulation (4) over each of three soldered terminal connections (6).
6.	Using heat gun, shrink tubing insulation (4) (JPG).

NOTE

Follow-on Maintenance Action Required:

Test stabilization shut-off box (para 24-2).
Install cover (para 24-6).

END OF TASK



24-11. ELECTRICAL CONNECTOR REMOVAL PROCEDURE

TOOLS: Soldering iron
No. 1 cross tip screwdriver (Phillips)
Knife

PERSONNEL: One

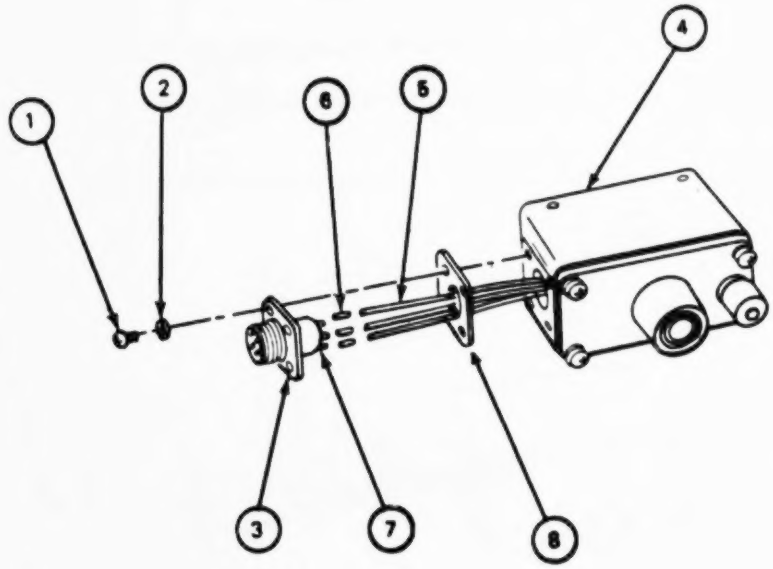
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test stabilization shut-off box (para 24-2)

24-11. ELECTRICAL CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) that attach electrical connector (3) to case (4).
2.	Pull electrical connector (3), with wiring (5) attached, from case (4) so you can get to wiring.
3.	Using knife, remove insulation (6) from three connector pins (7) on electrical connector (3).
4.	Tag each of three wires (5) attached to connector pins (7) (JPG).
5.	Using soldering iron, unsolder three wires (5) from connector pins (7) (JPG). Remove electrical connector (3) and gasket (8).
	END OF TASK



24-12. ELECTRICAL CONNECTOR INSTALLATION PROCEDURE

TOOLS: Soldering iron
No. 1 cross tip screwdriver (Phillips)
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 39, App. A)

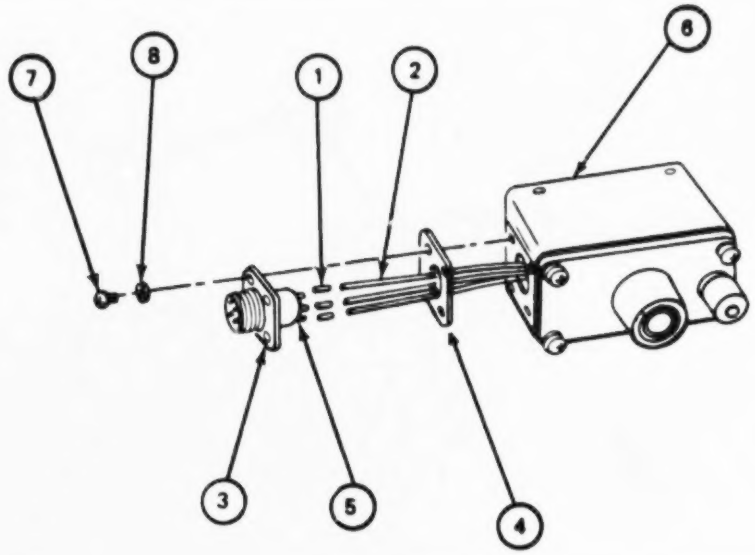
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

24-12. ELECTRICAL CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Put 1/2" long piece of tubing insulation (1) over each wire (2) to be soldered to electrical connector (3).
2.	Put three wires (2) through gasket (4).
3.	Using soldering iron, solder three tagged wires (2) to proper letter pin (5) on electrical connector (3) (JPG).
4.	Remove masking tape tags from three wires (2).
5.	Put tubing insulation (1) over each of three soldered pin connections (5).
6.	Using heat gun, shrink tubing insulation (1) (JPG).
7.	Carefully put electrical connector (3) and gasket (4) on case (6) while pushing three wires (2) inside case.
8.	Using screwdriver, attach electrical connector (3) to case (6) with four screws (7) and four lockwashers (8).
	NOTE Follow-on Maintenance Action Required: Test stabilization shut-off box (para 24-2). END OF TASK

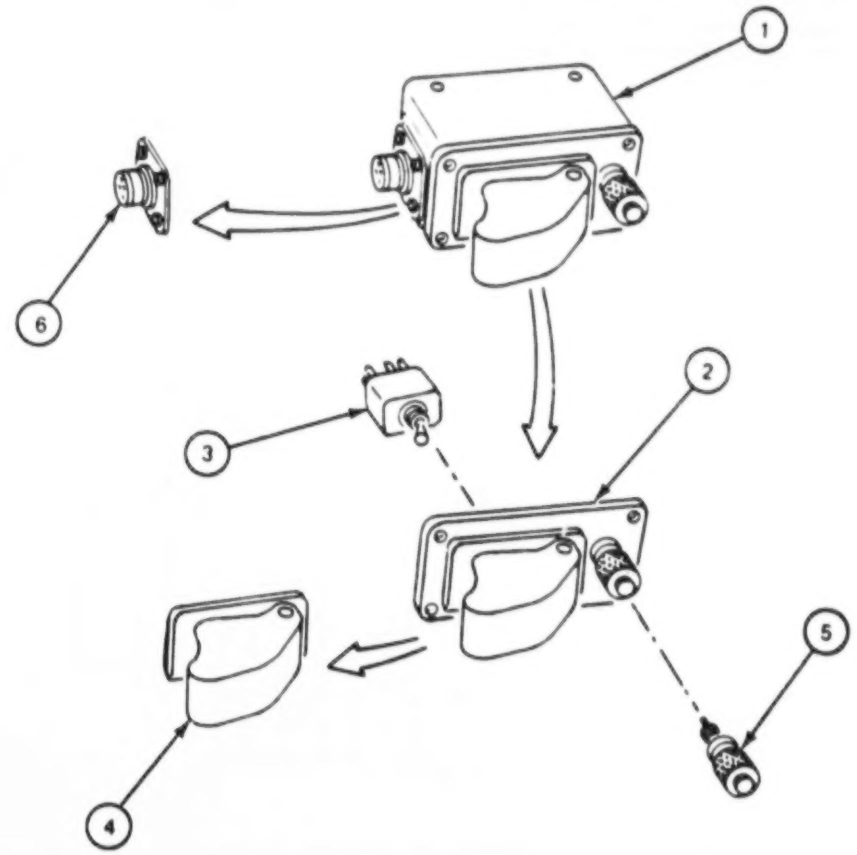


CHAPTER 25

GRENADE DISCHARGER POWER BOX

25-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Test	Removal	Tasks Installation	Disassembly	Assembly
1. Grenade Discharger Power Box	25-2			25-3	25-4
2. Cover		25-5	25-6		
3. Switch		25-7	25-8		
4. Switch Guard		25-7	25-8		
5. Lamp Housing		25-9	25-10		
6. Electrical Connector		25-11	25-12		



25-2. GRENADE DISCHARGER POWER BOX TEST PROCEDURE

TEST EQUIPMENT: Multimeter
24-28 vdc power source
Power source leads (two)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use multimeter
Remove and install lamps
Use power supply
TM 9-2350-257-20-2-3 for procedure to remove power box

EQUIPMENT CONDITION: Discharger power box removed (TM-20-2-3)

GENERAL INSTRUCTIONS:

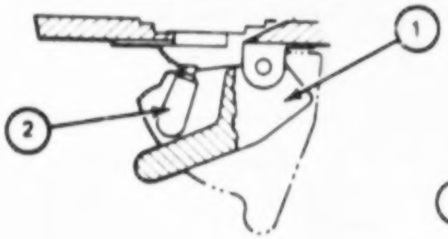
NOTE

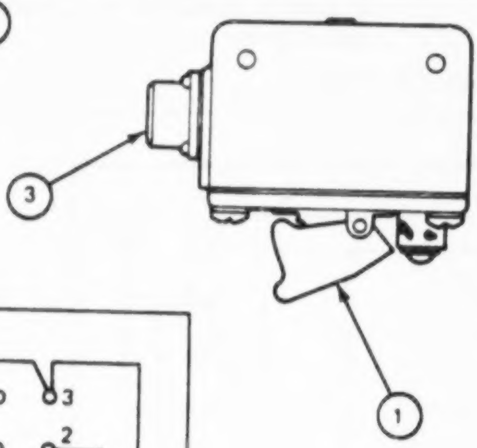
If normal indication is not obtained, remove cover (para 25-5) and do continuity checks on items listed in Probable Fault column (JPG). Refer to section index (para 25-1) for replacement of bad part.

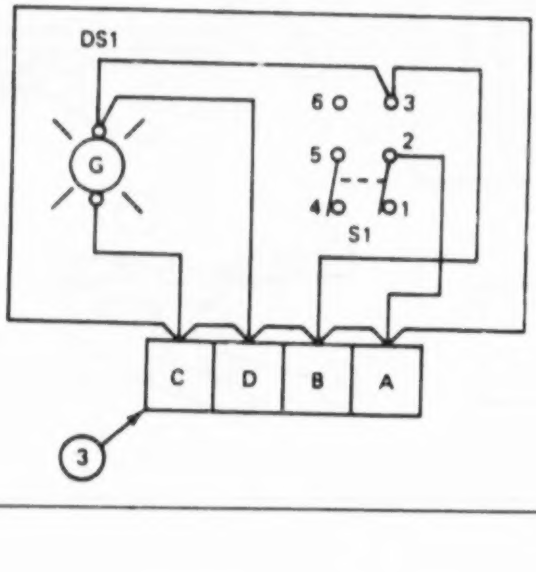
25-2. GRENADE DISCHARGER POWER BOX TEST PROCEDURE (CONT)

FRAME 1

Step	Procedure	Normal Indication	Probable Fault
1.	Lift guard (1) and push switch (2) to UP position.	. . .	. . .
2.	Using multimeter, check for continuity between connector (3) pins A and B (JPG).	Less than 2 ohms	Switch (2) Connector (3)
3.	Using multimeter, check for continuity between connector (3) pins B and D (JPG).	Less than 2 ohms	Switch (2) Connector (3)
4.	Set switch (2) to OFF (close switch guard (1)).	. . .	. . .
5.	Using multimeter, check for continuity between connector (3) pins A and B (JPG). GO TO FRAME 2	Greater than 10 million ohmns	Switch (2)







25-2. GRENADE DISCHARGER POWER BOX TEST PROCEDURE (CONT)

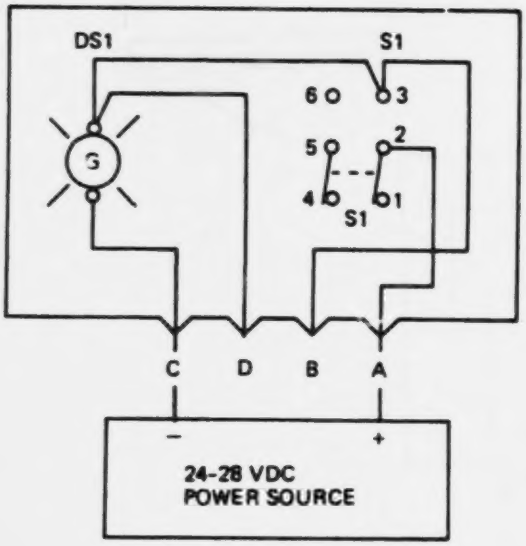
FRAME 2

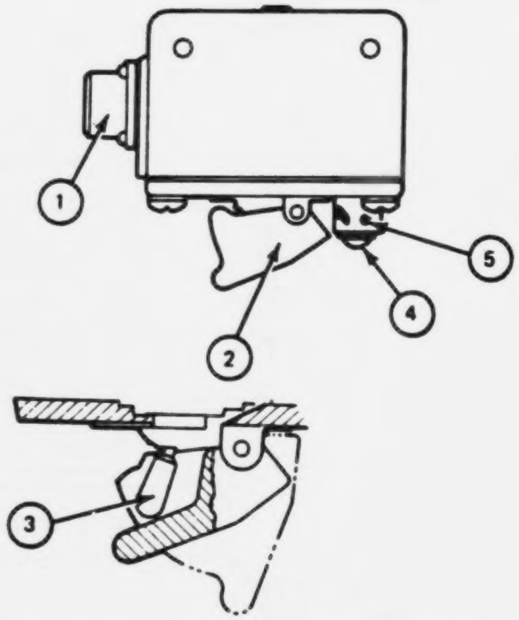
Step	Procedure	Normal Indication	Probable Fault
1.	Connect positive lead of power source to connector (1) pin A (JPG).	. . .	. . .
2.	Connect negative lead of power source to connector (1) pin C (JPG).	. . .	. . .
3.	Lift switch guard (2) and set switch (3) to UP position.	Lamp (4) lights	Switch (3) Lamp housing (5) Connector (1)
4.	Set switch (3) to OFF position (close switch guard (2)).	Lamp (4) goes out	Switch (3)
5.	Disconnect power source leads.	. . .	. . .

NOTE

If normal indication was obtained in frames 1 and 2, part is good.

END OF TASK





25-3. GRENADE DISCHARGER POWER BOX DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove grenade discharger power box

EQUIPMENT CONDITIONS: Grenade discharger power box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test grenade discharger power box (para 25-2)

FRAME 1

Step	Procedure
1.	Remove cover (para 25-5).
2.	Remove switch and switch guard (para 25-7).
3.	Remove lamp housing (para 25-9).
4.	Remove electrical connector (para 25-11).
	END OF TASK

25-4. GRENADE DISCHARGER POWER BOX ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Install electrical connector (para 25-12).
2.	Install lamp housing (para 25-10).
3.	Install switch and switch guard (para 25-8).
4.	Install cover (para 25-6).
	NOTE Follow-on Maintenance Action Required: Test grenade discharger power box (para 25-2).
	END OF TASK

25-5. COVER REMOVAL PROCEDURE

TOOLS: No. 3 cross tip screwdriver (Phillips)

PERSONNEL: One

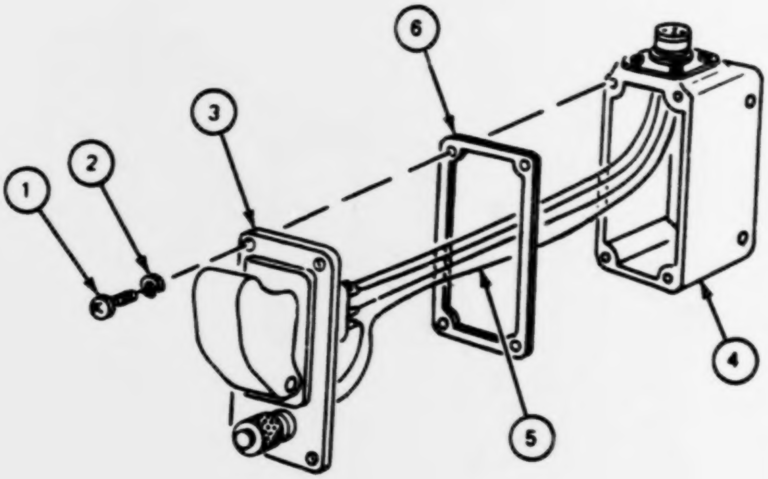
REFERENCES: TM 9-2350-257-20-2-3 for procedure to remove grenade discharger power box

EQUIPMENT CONDITIONS: Grenade discharger power box removed from vehicle (TM-20-2-3)

PRELIMINARY PROCEDURES: Test grenade discharger power box (para 25-2)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) that hold cover (3) to case (4).
2.	Lift cover (3) with wires (5) attached, so you can get to parts inside case (4).
3.	Remove gasket (6) by sliding over cover (3).
	END OF TASK



25-6. COVER INSTALLATION PROCEDURE

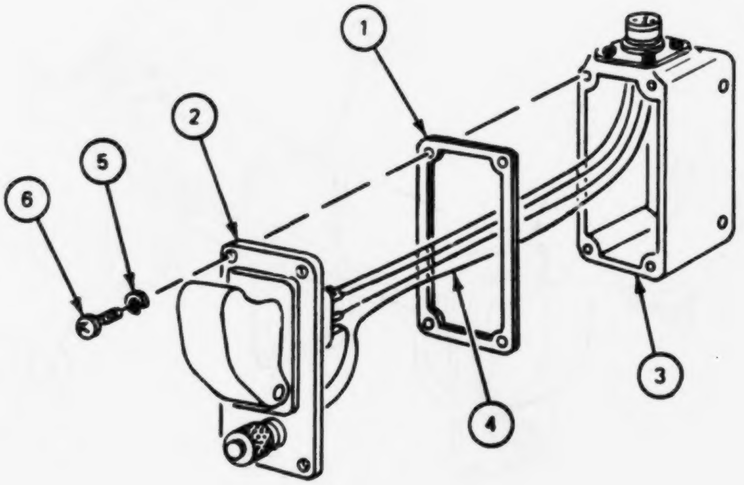
TOOLS: No. 3 cross tip screwdriver (Phillips)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install electrical connector (para 25-12)

FRAME 1

Step	Procedure
1.	Slide gasket (1) over cover (2).
2.	Carefully place gasket (1) and cover (2) on case (3) while pushing wires (4) inside case (3).
3.	Using screwdriver, attach cover (2) to case (3) with four lockwashers (5) and four screws (6).
	END OF TASK



25-7. SWITCH AND SWITCH GUARD REMOVAL PROCEDURE

TOOLS: Soldering iron
Knife
9/16" combination wrench

SUPPLIES: Masking tape (item 36, App. A)
Pencil

PERSONNEL: One

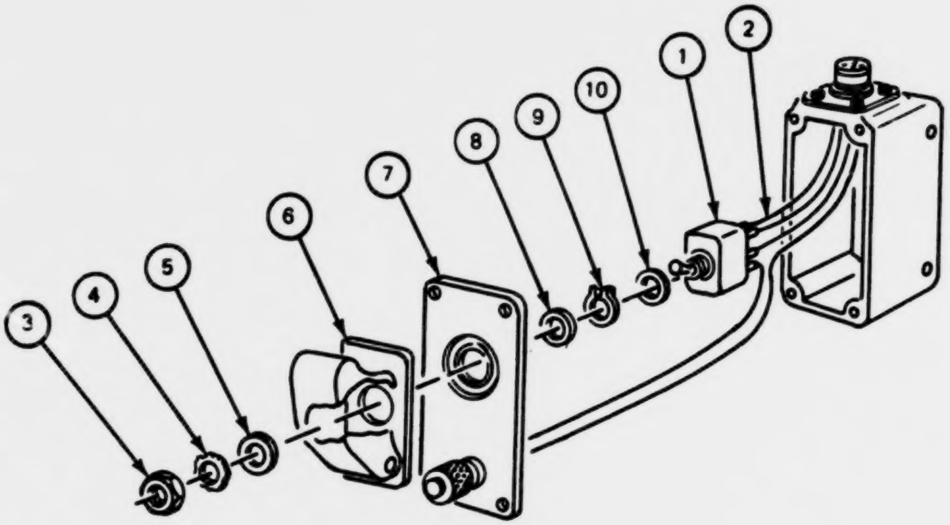
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test grenade power box (para 25-2)
Remove cover (para 25-5)

25-7. SWITCH AND SWITCH GUARD REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using knife, remove tubing insulation from four terminals of switch (1).
2.	Using masking tape, tag each wire (2) connected to switch (1) terminals (JPG).
3.	Using soldering iron, unsolder electrical wires (2) from switch (1) terminals (JPG).
4.	Using wrench, remove nut (3), lockwasher (4), flat washer (5) and switch guard (6) from switch (1).
5.	Remove switch (1) from cover (7).
6.	Remove gasket (8), key washer (9) and flat washer (10) from switch (1).
	END OF TASK



25-8. SWITCH AND SWITCH GUARD INSTALLATION PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 41, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering gun
Use heat gun

25-8. SWITCH AND SWITCH GUARD INSTALLATION PROCEDURE (CONT)

FRAME 1

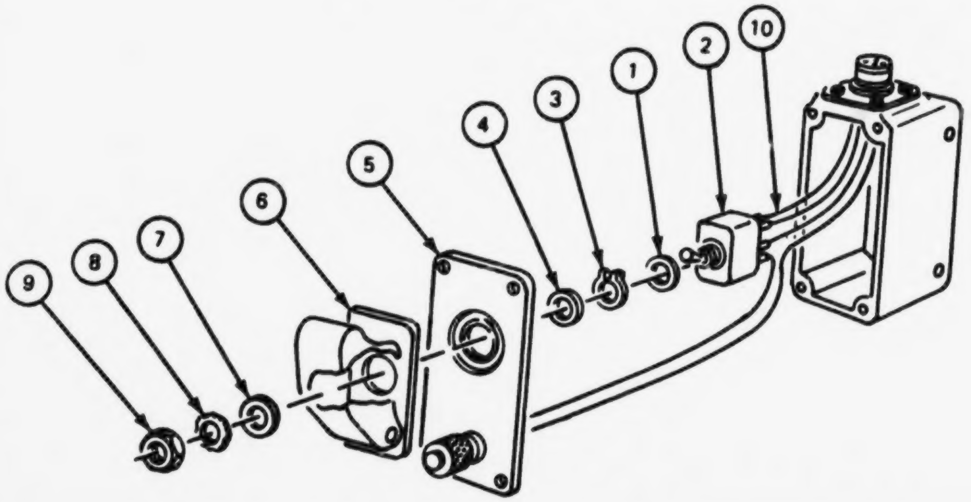
Step	Procedure
1.	Put flat washer (1) on switch (2).
2.	Put key washer (3) on switch (2) with key tab facing out.
3.	Put gasket (4) on switch (2).
4.	Place switch (2) through hole in cover (5) with key tab aligned with keyway of cover.
5.	Put switch guard (6), flat washer (7) and lockwasher (8) on switch (2).
6.	Using wrench, put nut (9) on switch (2).
7.	Put 1/2" long piece of tubing insulation over each wire (10).
8.	Using soldering iron, solder tagged wires (10) to switch (2) terminals (JPG).
9.	Put tubing insulation over switch (2) soldered connections.
10.	Using heat gun, shrink tubing insulation (JPG).

NOTE

Follow-on Maintenance Action Required:

Install cover (para 25-6).
Test grenade discharger power box (para 25-2).

END OF TASK



25-9. LAMP HOUSING REMOVAL PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench
Knife
O-ring extractor kit

SUPPLIES: Masking tape (item 36, App. A)
Pencil

PERSONNEL: One

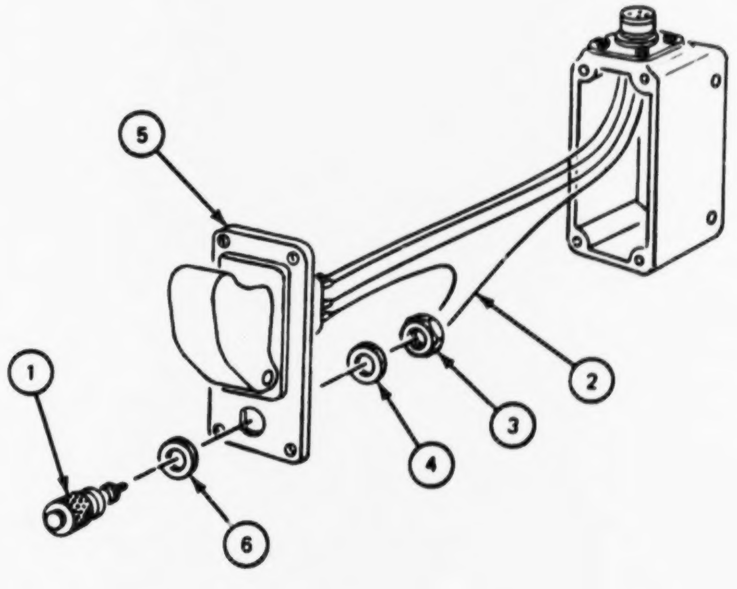
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires
Remove lamp
Remove preformed packing

PRELIMINARY PROCEDURES: Test grenade discharger power box (para 25-2)
Remove cover (para 25-5)

25-9. LAMP HOUSING REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using knife, remove tubing insulation from two terminals on lamp housing (1).
2.	Using masking tape, tag wires (2) (JPG).
3.	Using soldering iron, unsolder two wires (2) from terminals on lamp housing (1).
4.	Using wrench, remove nut (3) and lockwasher (4) holding lamp housing (1) to cover (5).
5.	Remove lamp housing (1) from cover (5).
6.	Using O-ring extractor tool, remove preformed packing (6) from lamp housing (1) (JPG).
	END OF TASK



25-10. LAMP HOUSING INSTALLATION PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench
Heat gun (NSN 4940-00-561-1002)
O-ring extractor kit

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 41, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun
Install preformed packing

25-10. LAMP HOUSING INSTALLATION PROCEDURE (CONT)

FRAME 1

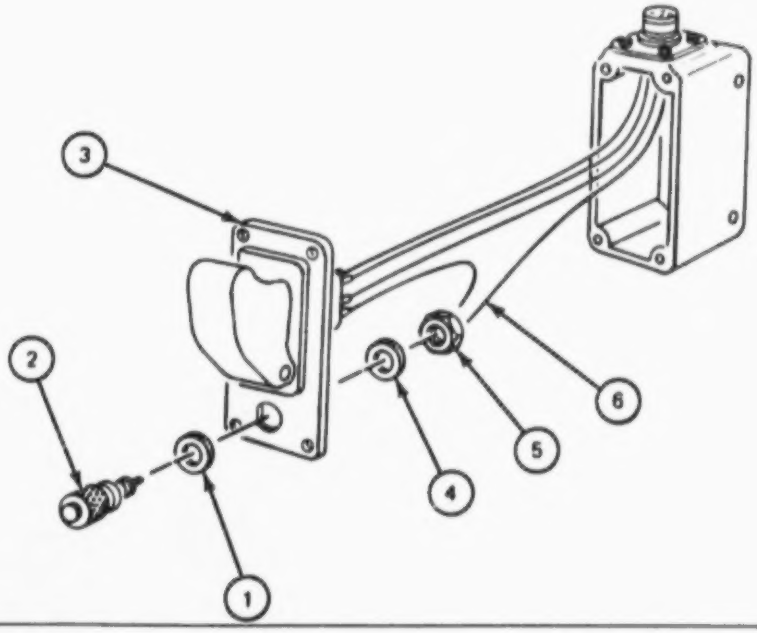
Step	Procedure
1.	Using O-ring extractor tool, put preformed packing (1) on lamp housing (2) (JPG).
2.	Using wrench, attach lamp housing (2) to cover (3) with lockwasher (4) and nut (5).
3.	Put 1/2" long piece of tubing insulation over two wires (6).
4.	Using soldering iron, solder tagged wires (6) to lamp housing (2) terminals (JPG).
5.	Put tubing insulation over soldered lamp housing (2) terminals.
6.	Using heat gun, shrink tubing insulation (JPG).
7.	Remove masking tape tags from wires (6).

NOTE

Follow-on Maintenance Action Required:

Install cover (para 25-6).
Test grenade discharger power box (para 25-2).

END OF TASK



25-11. ELECTRICAL CONNECTOR REMOVAL PROCEDURE

TOOLS: Soldering iron
No. 1 cross tip screwdriver (Phillips)
Knife

SUPPLIES: Masking tape (item 36, App. A)
Pencil

PERSONNEL: One

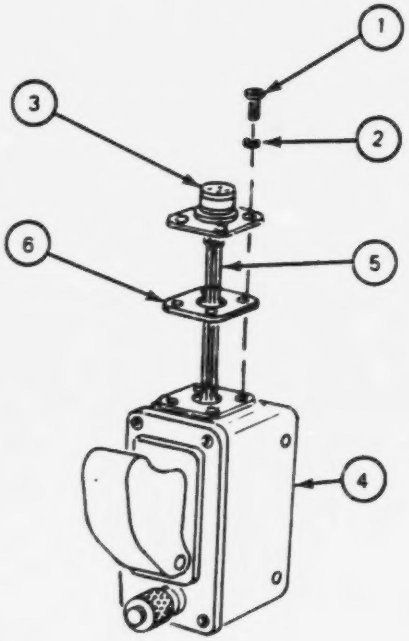
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test grenade discharger power box (para 25-2)

25-11. ELECTRICAL CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) that hold electrical connector (3) to case (4).
2.	Pull connector (3) with wiring (5) attached from case (4) so you can get to the wiring.
3.	Using knife, remove tubing insulation from four connector (3) pins.
4.	Using masking tape, tag each wire (5) (JPG).
5.	Using soldering iron, unsolder four wires (5) from electrical connector (3) pins (JPG).
6.	Remove electrical connector (3) and gasket (6) from case (4).
	END OF TASK



25-12. ELECTRICAL CONNECTOR INSTALLATION PROCEDURE

TOOLS: Soldering iron
No. 1 cross tip screwdriver (Phillips)
Heat gun (NSN 4940-00-561-1002)

SUPPLIES: Solder (item 31, App. A)
Tubing insulation (item 41, App. A)

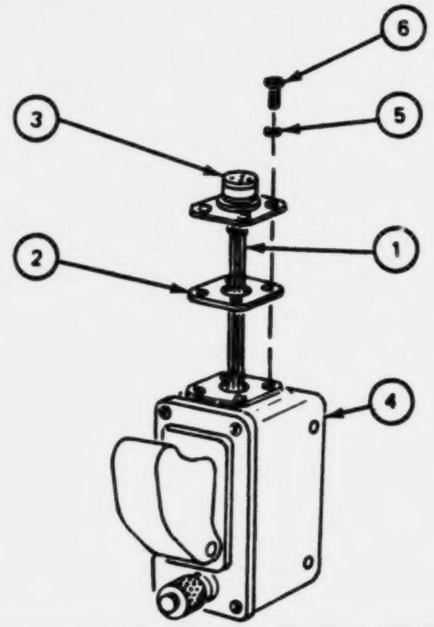
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

25-12. ELECTRICAL CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Put 1/2" long piece of tubing insulation over four wires (1).
2.	Put four wires (1) through gasket (2).
3.	Using soldering iron, solder four wires (1) to proper pins on electrical connector (3) (JPG)
4.	Remove tags from four wires (1).
5.	Put tubing insulation over pins of electrical connector (3).
6.	Using heat gun, shrink tubing insulation (JPG).
7.	Put gasket (2) and electrical connector (3) on case (4) and align holes.
8.	Using screwdriver, attach electrical connector (3) to case (4) with four lockwashers (5) and four screws (6).
	NOTE
	Follow-on Maintenance Action Required:
	Test grenade discharger power box (para 25-2).
	END OF TASK



APPENDIX A

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section 1. Introduction

A-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the M60A1 (RISE) tank and M60A1 (RISE PASSIVE) tank. This listing is for informational purposes only and is not authority to requisition the listed item. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

A-2. EXPLANATION OF COLUMNS

a. Column 1 - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the materials, e.g. Dry cleaning solvent (item 33, App. A).

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National stock number assigned to the item; use it to request the listed item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1.	O	8040-00-515-2250	Adhesive	QT
2.	O	8040-00-152-0023	Adhesive, Class III, MMM-A-132, Type I	KT
3.	O	8040-00-893-1882	Adhesive, Rubber, MMM-A-1617, Type II, 3 oz.	OZ
	O	8040-01-036-5432	Adhesive, Rubber, MMM-A-1617, Type II, 1 gal.	GL
4.	C	8040-00-664-4318	Adhesive, Type II, MIL-A-5092, 4 oz. tube	TU
5.	F	8040-00-181-7529	Adhesive, Sealant, MIL-R-46082	BT
6.	C	8020-00-224-6024	Brush, Artist	EA
7.	C	5350-00-221-0872	Cloth, Abrasive, Crocus, CA, 50 Sheets	PKG
8.			Not Used	
9.	O	6850-00-880-7616	Compound, Silicone, 8 oz. tube	TU
10.	O	9150-00-111-6256	Fluid, Hydraulic, FRH, MIL-H-46170	QT
11.	O	6830-00-264-9086	Gas, Nitrogen, Dry, Type I, Class I, GRADE 6, BB-N-411, 275 of Cylinder	CY
	O	6830-00-656-1596	Gas, Nitrogen, Dry, Type I, Class I, GRADE 6, BB-N-411, 200 of Cylinder	CY
12.	C	9150-00-190-0904	Grease, Automotive and Artillery, GAA, 1 lb. Can (MIL-G-10924)	CN
	C	9150-00-935-1017	Grease, Automotive and Artillery, GAA, 14 oz. Cartridge (MIL-G-10924)	EA
	C	9150-00-190-0905	Grease, Automotive and Artillery, GAA, 5 lb. Can (MIL-G-10924)	CN
13.	F	9150-00-261-8297	Grease, Aeronautical, (Preservative), MIL-G-3278	CN
	F	9150-00-261-8298	Grease, Aeronautical, (Preservative), MIL-G-3278	CN
	F	9150-00-190-0898	Grease, Aeronautical, (Preservative), MIL-G-3278	CN
14.	F	9150-00-985-7244	Grease, Aircraft and Instrument (MIL-G-23827), 4 oz. Tube	TU
15.	C	9150-00-231-2360	Oil, Lubricating, Medium, PL, GP, 1 qt. Can (MIL-L-3150)	CN
	C	9150-00-231-2361	Oil, Lubricating, Medium, PL, GP, 1 qt. Can (MIL-L-3150)	CN

Para A-2 Cont

(1) Item	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
16.		9150-00-231-6689	Oil, Lubricating, PL-S, GP, VV-L-800	QT
17.			Not Used	
18.	F	9150-00-802-4478	Oil, (MIL-L-10295)	QT
19.	F	9150-00-664-6518	Oil, Instrument (MIL-6085)	BT
20.			Not Used	
21.	C	7920-00-205-1711	Rag, Wiping, Cotton, 50 lb. Bale Cloth, Lint-free	BL
22.			Not Used	
23.	F		Sandpaper, Number 4/0	ST
24.			Not Used	
25.	O	8030-00-275-8114	Sealing Compound, (MIL-S-11030), 1 pt. Can	CN
	O	8030-00-242-3194	Sealing Compound, (MIL-S-11030), 1 qt. Can	CN
	O	8030-00-433-4145	Sealing Compound, (MIL-S-11030), 50 ft. Roll	RO
	O	8030-00-965-2437	Sealing Compound, (MIL-S-11030), 90 ft. Roll	RO
26.	O	8030-00-275-8110	Sealing Compound, (MIL-S-11031), Kit	EA
	O	8030-00-537-7925	Sealing Compound, (MIL-S-11031), Kit	EA
	O	8030-00-656-1042	Sealing Compound, (MIL-S-11031), Kit	EA
27.	O	8030-01-013-9306	Sealing Compound, (MIL-S-22473), 8 oz. Bottle	BT
28.	O	8030-00-025-1692	Sealing Compound, (MIL-S-46163), Type II, GRADE 5, 250 cc Bottle	BT
29.			Not Used	
30.			Not Used	
31.	F	3439-00-003-8601	Solder, SN 60, (QQ S-571) Solder, SN 50	CN
32.	O	6850-00-826-2156	Solvent, Cleaning Compound, (Trichloroethylene), (MIL-C-81302), 1 pt. Can	CN
	O	6850-00-826-5853	Solvent, Cleaning Compound, (Trichloroethylene), (MIL-C-81302), 5 gal. Can	CN
	O	6850-00-935-1082	Solvent, Cleaning Compound, (Trichloroethylene), (MIL-C-81302), 55 gal. Drum	DR

Para A-2 Cont

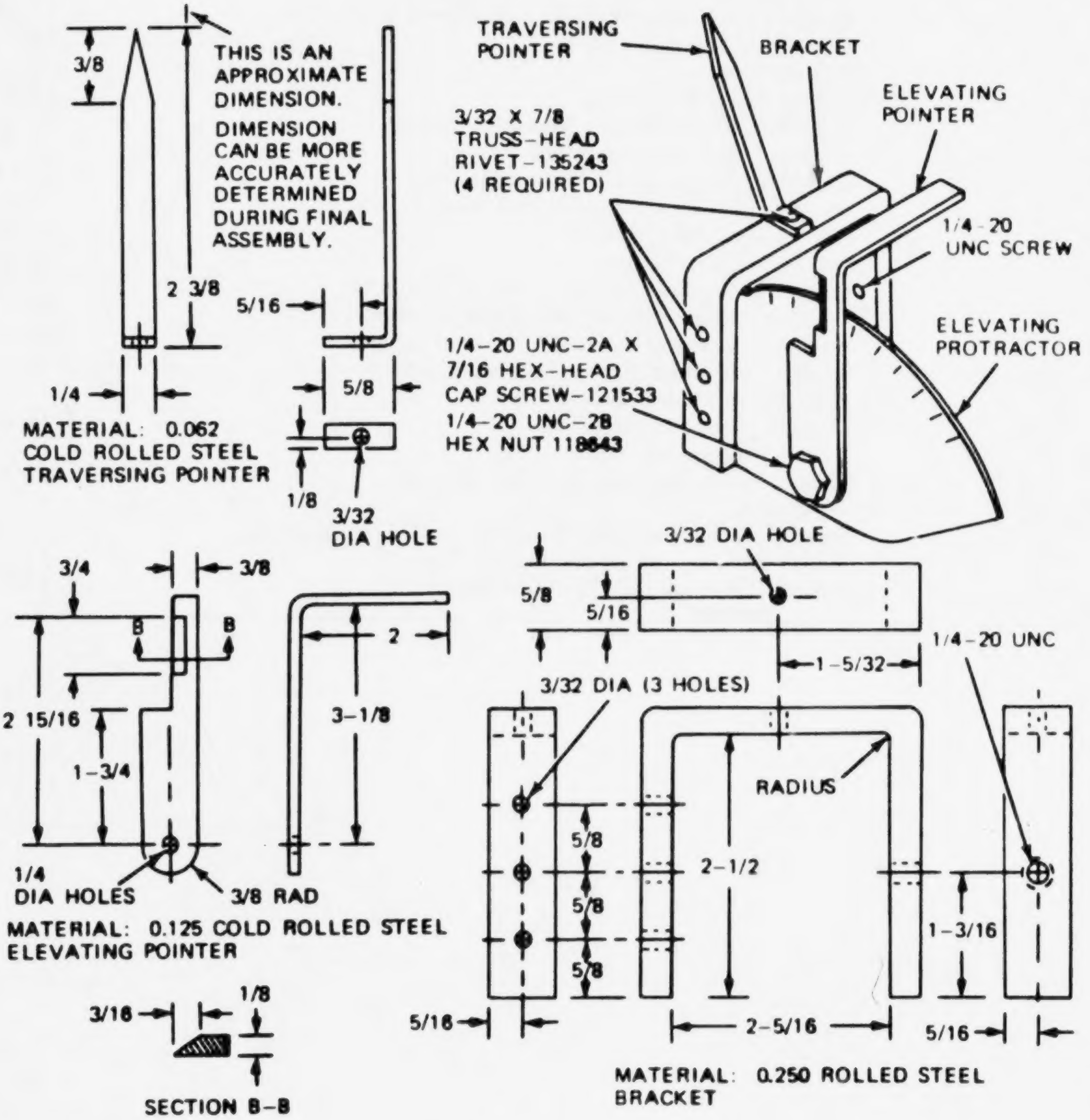
(1) Item	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
33	C	6850-00-664-5685	Solvent, Dry Cleaning, SD, 1 qt. Can (P-D-680)	CN
	C	6850-00-281-1985	Solvent, Dry Cleaning, SD, 1 gal. Can (P-D-680)	CN
34.			Not Used	
35.	O	5970-00-184-2002	Tape, Electrical Insulation, GRADE A, Spec HH-T-00111, 1/32 inch thick, 2.00 inches wide	RL
36.	C	8135-00-551-1245	Tape, Adhesive, 6 yd. Roll, Olive, Opaque, W	RL
37.	C	8110-00-242-2089	Thinner, Paint, TDN, 1 gal. Can	CN
38.	C	3610-00-810-0571	Tissue, Lens, Box of 240 Each	BX
39.	F	5970-00-082-3942	Tubing, Insulation, (MIL-I-23053/5)	FT
40.			Not Used	
41.	F	5970-00-815-1295	Tubing, Insulation, (MIL-123053-5)	FT
42.	F	5470-00-357-7463	Tubing, Polylefin (.375 id, MIL-R-46846), Type V	FT

Para A-2 Cont

APPENDIX B

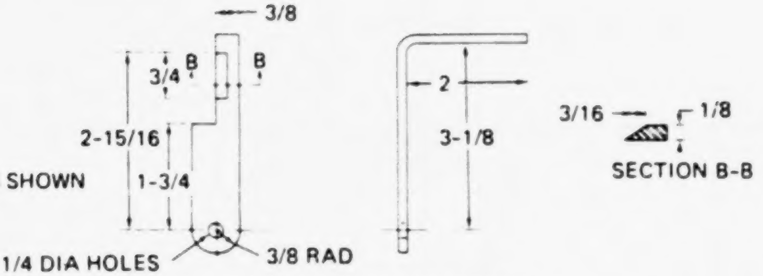
FABRICATED TOOLS

Item	Title	Paragraph
1	Commander's Control Protractors	14-2
2	Main Accumulator End-Cup Removal Tool	16-4
3	Power Pack Filter Test and Adjustment Tool	13-38
4	Cupola Adapter A and B	12-3
5	Turret Stand	2-6
6	Spring Wire Hook Tool	18-6
7	Magnetic Brake Torque Wrench Adapter	20-91
8	Shuttle Valve Test Manifold	13-20
9	Elevating Screw Jack Holding Fixture	12-18
10	Muzzle and Breech End Wood Blocks	11-4
11	Replenisher Push Rod	11-38
12	Oil Filter Test Fixture	13-36
13	Gunner's Control Hydraulic Valve Manifold	13-105
14	Gunner's Control Hydraulic Valve Fixture	13-105
15	Gunner's Control Hydraulic Valve Adapter	13-105
16	Manual Elevation Pump Test Manifold	13-53
17	Gun Mount Wood Block	11-7
18	Cannon Tube Wood Block	11-20
19	Recoil Mechanism Wood Block	11-17
20	Recoil Piston Adapter Spanner Wrench	11-17
21	Deleted	
22	Recoil Mechanism Drill Extension and Split Bushing	11-19
23	Recoil Mechanism Upper Guide Plate	11-19
24	Spanner Wrench (12251792 Modified)	11-3


3/8
THIS IS AN APPROXIMATE DIMENSION.
DIMENSION CAN BE MORE ACCURATELY DETERMINED DURING FINAL ASSEMBLY.
2 3/8
5/16
1/4
5/8
MATERIAL: 0.062 COLD ROLLED STEEL
TRAVERSING POINTER
1/8
3/32 DIA HOLE
TRAVERSING POINTER
BRACKET
ELEVATING POINTER
3/32 X 7/8 TRUSS-HEAD RIVET-135243 (4 REQUIRED)
1/4-20 UNC SCREW
ELEVATING PROTRACTOR
1/4-20 UNC-2A X 7/16 HEX-HEAD CAP SCREW-121533
1/4-20 UNC-2B HEX NUT 118843
3/4
3/8
B
B
2 15/16
1-3/4
1/4 DIA HOLES
3/8 RAD
2
3-1/8
MATERIAL: 0.125 COLD ROLLED STEEL
ELEVATING POINTER
3/16
1/8
SECTION B-B
3/32 DIA HOLE
5/8
5/16
1-5/32
1/4-20 UNC
3/32 DIA (3 HOLES)
RADIUS
5/8
5/8
5/8
2-1/2
1-3/16
5/16
2-5/16
5/16
MATERIAL: 0.250 ROLLED STEEL
BRACKET

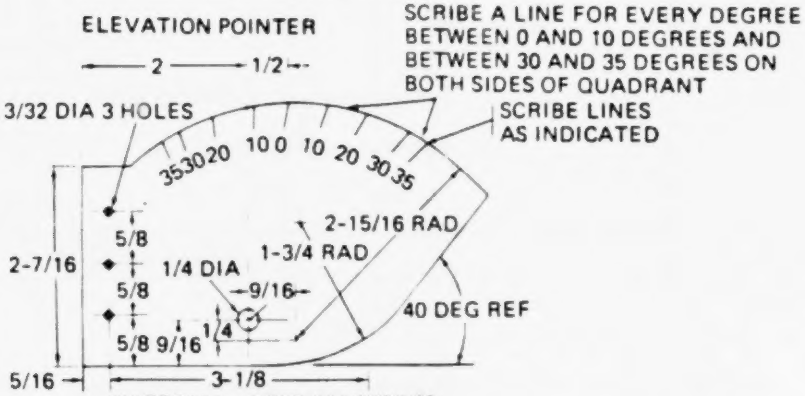
1. COMMANDER'S CONTROL PROTRACTORS (SHEET 1 OF 2)

NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES

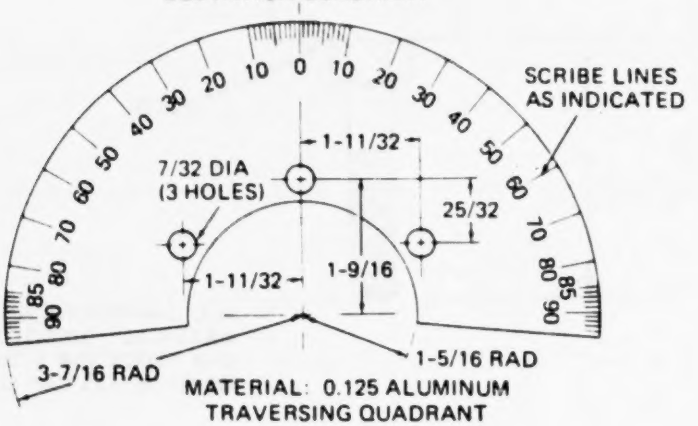

3/8
3/4
B
B
2-15/16
1-3/4
1/4 DIA HOLES
3/8 RAD
2
3-1/8
3/16
1/8
SECTION B-B

MATERIAL: 0.125 COLD ROLLED STEEL

ELEVATION POINTER

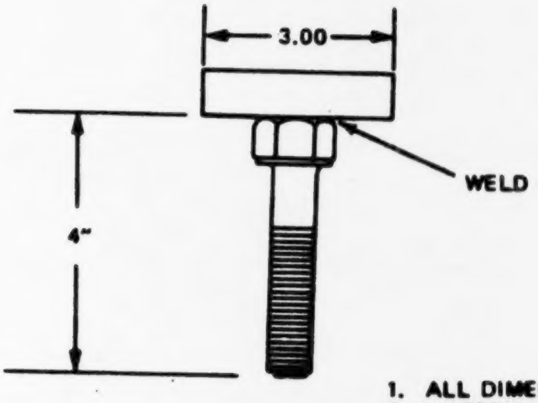

2
1/2
SCRIBE A LINE FOR EVERY DEGREE BETWEEN 0 AND 10 DEGREES AND BETWEEN 30 AND 35 DEGREES ON BOTH SIDES OF QUADRANT
3/32 DIA 3 HOLES
SCRIBE LINES AS INDICATED
35 30 20 10 0 10 20 30 35
2-15/16 RAD
1-3/4 RAD
2-7/16
5/8
5/8
1/4 DIA
9/16
40 DEG REF
5/8
9/16
1/4
5/16
3-1/8

MATERIAL: 0.062 ALUMINUM
ELEVATION QUADRANT


90 85 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 85 90
SCRIBE LINES AS INDICATED
1-11/32
7/32 DIA (3 HOLES)
25/32
1-9/16
1-11/32
3-7/16 RAD
1-5/16 RAD

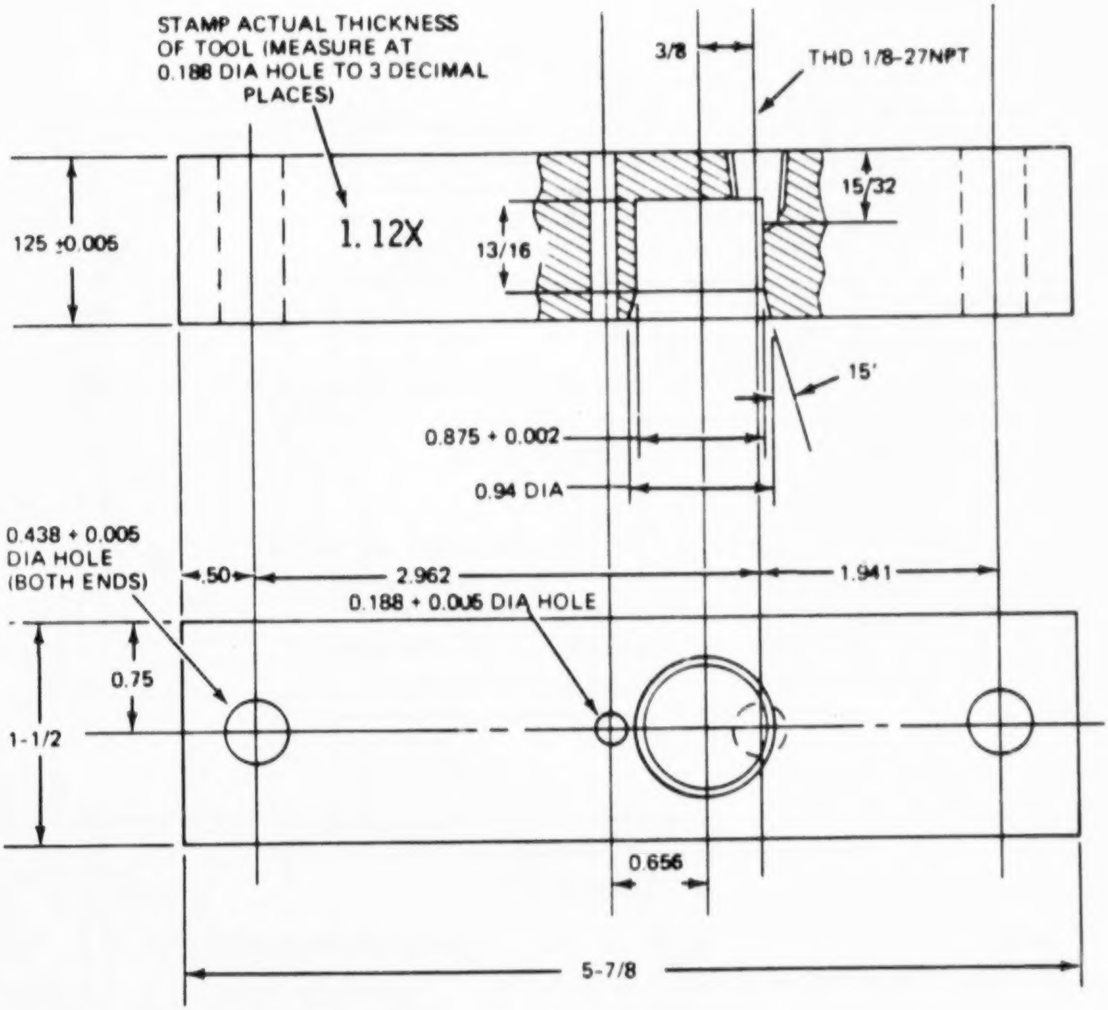
MATERIAL: 0.125 ALUMINUM
TRAVERSING QUADRANT

1. COMMANDER'S CONTROL PROTRACTORS (SHEET 2 OF 2)



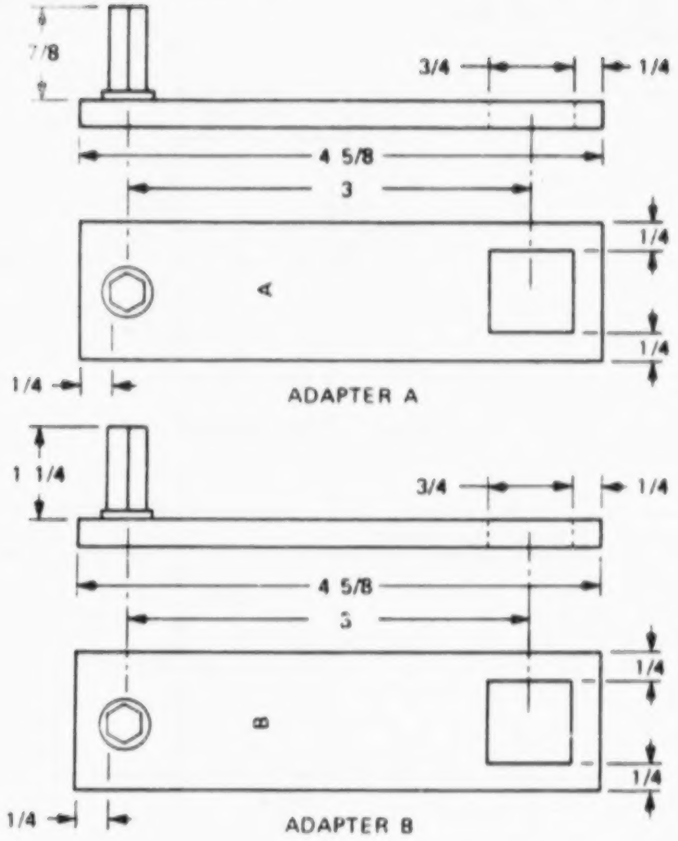
1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: 1020/1030 STEEL 3/8" DIA. BAR STOCK (OR EQUIVALENT); MS 90728–123 CAP SCREW.

2. MAIN ACCUMULATOR END-CAP REMOVAL TOOL


STAMP ACTUAL THICKNESS
OF TOOL (MEASURE AT
0.188 DIA HOLE TO 3 DECIMAL
PLACES)
3/8
THD 1/8-27NPT
125 ±0.005
1.12X
13/16
15/32
15'
0.875 + 0.002
0.94 DIA
0.438 + 0.005
DIA HOLE
(BOTH ENDS)
.50
2.962
1.941
0.188 + 0.005 DIA HOLE
0.75
1-1/2
0.656
5-7/8

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: 1020/1030 STEEL.
3. TOL: 3 PC DEC ±0.005, 2 PC DEC ±0.02 FRACTIONS ±1/32
4. SURFACE FINISH: 125 RMS
5. BREAK SHARP EDGES AND REMOVE BURRS.

3. POWER PACK FILTER TEST AND ADJUSTMENT TOOL


7/8
3/4
1/4
4 5/8
3
1/4
1/4
A
1/4
ADAPTER A
1 1/4
3/4
1/4
4 5/8
3
1/4
1/4
B
1/4
ADAPTER B

NOTES:

1. ALL DIMENSIONS IN INCHES.
2. DIMENSION BETWEEN CENTERLINES OF 3/4 DRIVE SQUARE AND HEX MUST BE 3 INCHES.
3. METAL STAMP LETTERS ON EACH TOOL FOR IDENTIFICATION.
4. HEX STOCK WELDED TO STEEL STOCK.

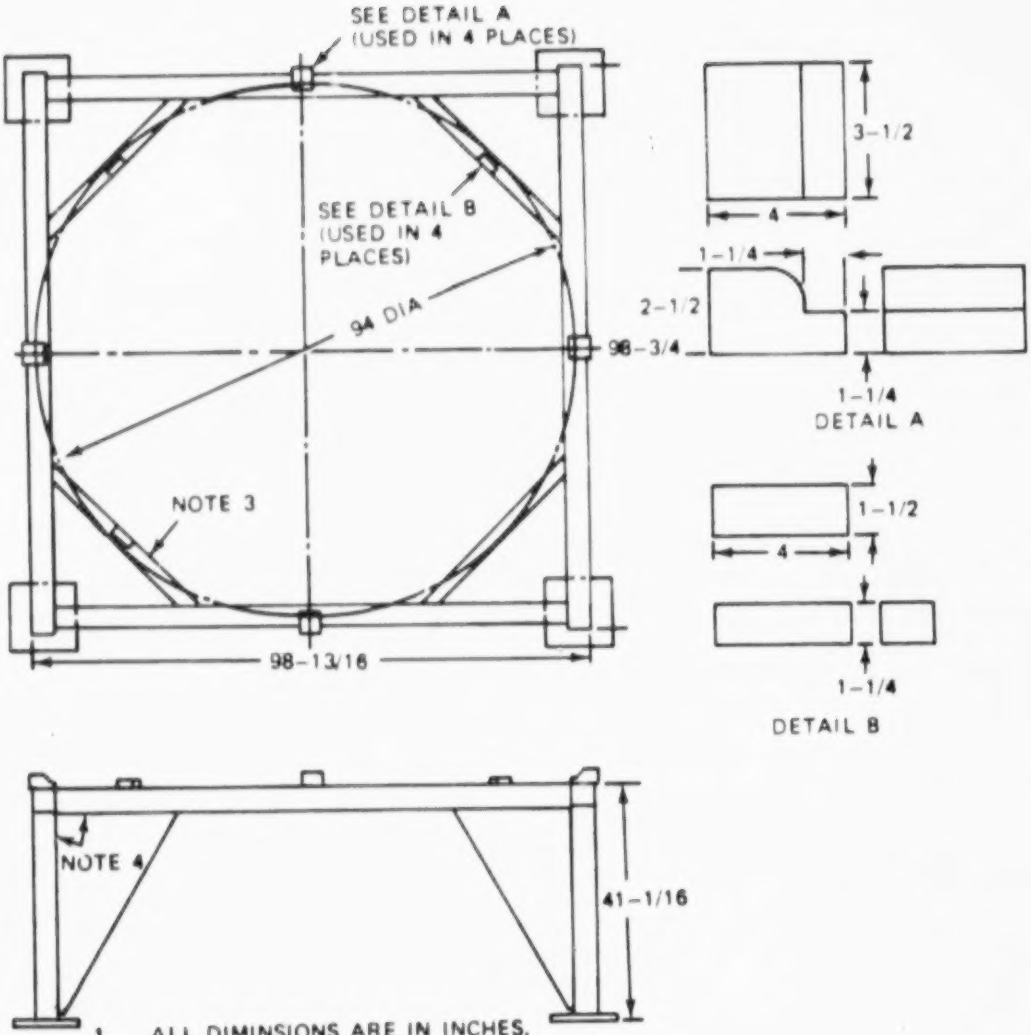
MATERIAL REQUIRED:

3/8 STEEL STOCK

9/16 HEX STOCK 7/8 LONG

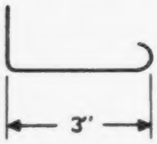
9/16 HEX STOCK 1-1/4 LONG

4. CUPOLA ADAPTERS A AND B


SEE DETAIL A
(USED IN 4 PLACES)
SEE DETAIL B
(USED IN 4
PLACES)
94 DIA
98-3/4
NOTE 3
98-13/16
3-1/2
4
1-1/4
2-1/2
1-1/4
DETAIL A
1-1/2
4
1-1/4
DETAIL B
NOTE 4
41-1/16

1. ALL DIMINSIONS ARE IN INCHES.
2. MATERIAL: 1015/1025 STEEL.
3. CHANNEL BRACES.
4. MAKE FROM CHANNELS WELDED IN BOX SECTION.
5. TOL: FRACTIONS ±1/16.
6. BREAK SHARP EDGES.

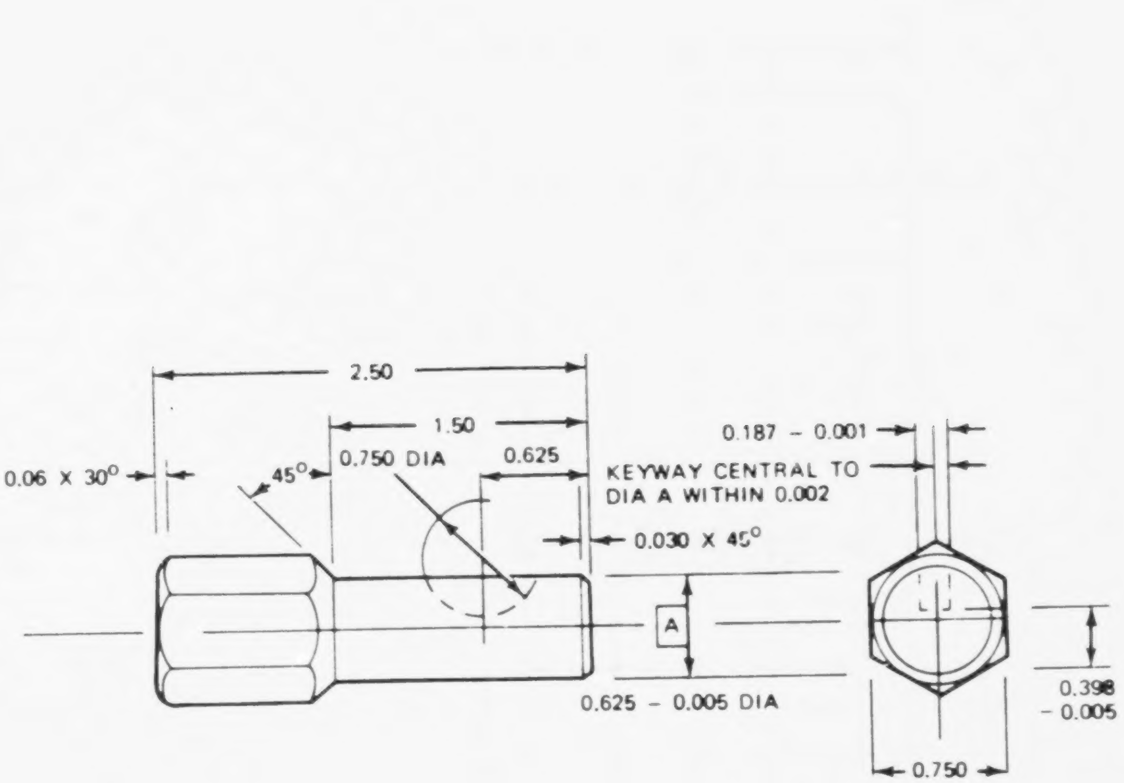
5. TURRET STAND



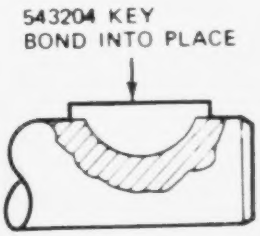
SPRING WIRE
HOOK TOOL

MATERIAL: LOCKWIRE

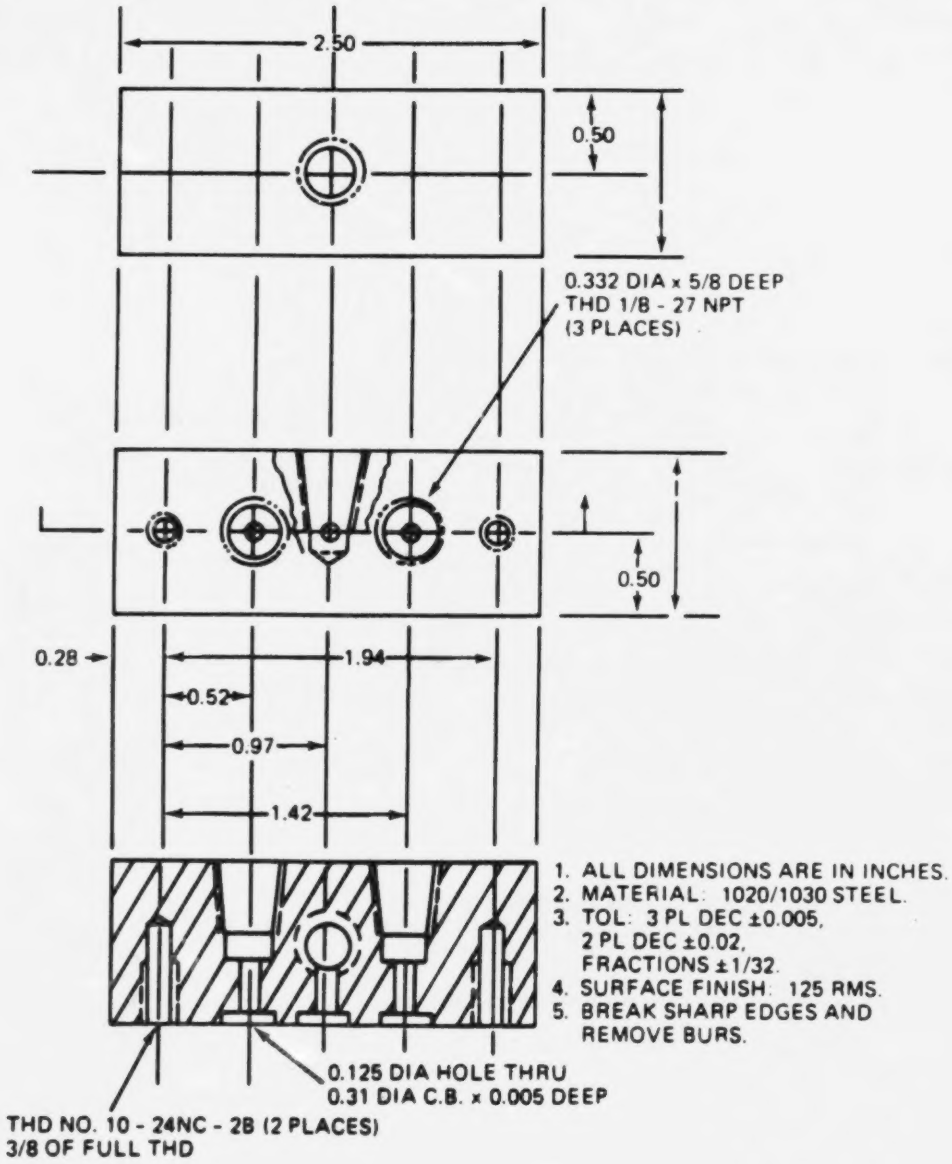
6. SPRING WIRE HOOK TOOL


2.50
1.50
0.06 X 30°
45°
0.750 DIA
0.625
0.187 – 0.001
KEYWAY CENTRAL TO
DIA A WITHIN 0.002
0.030 X 45°
A
0.625 – 0.005 DIA
0.398
– 0.005
0.750

1. ALL DIMENSIONS ARE IN INCHES
2. MATERIAL: 1030, 1040, 4130, OR 4140 STEEL
3. TOL: 3 PL DEC ±0.010, 2 PL DEC ±0.03, ANGLES ±2
4. BREAK SHARP EDGES AND REMOVE BURRS

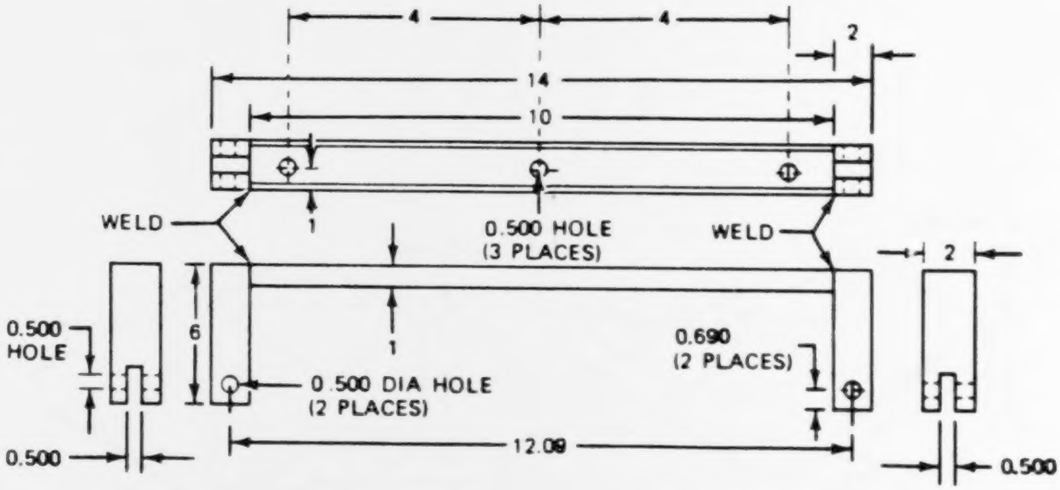

543204 KEY
BOND INTO PLACE

7. MAGNETIC BRAKE TORQUE WRENCH ADAPTER


2.50
0.50
0.332 DIA x 5/8 DEEP
THD 1/8 - 27 NPT
(3 PLACES)
0.50
0.28
1.94
0.52
0.97
1.42
0.125 DIA HOLE THRU
0.31 DIA C.B. x 0.005 DEEP
THD NO. 10 - 24NC - 2B (2 PLACES)
3/8 OF FULL THD

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: 1020/1030 STEEL.
3. TOL: 3 PL DEC ±0.005,
   2 PL DEC ±0.02,
   FRACTIONS ±1/32.
4. SURFACE FINISH: 125 RMS.
5. BREAK SHARP EDGES AND REMOVE BURS.

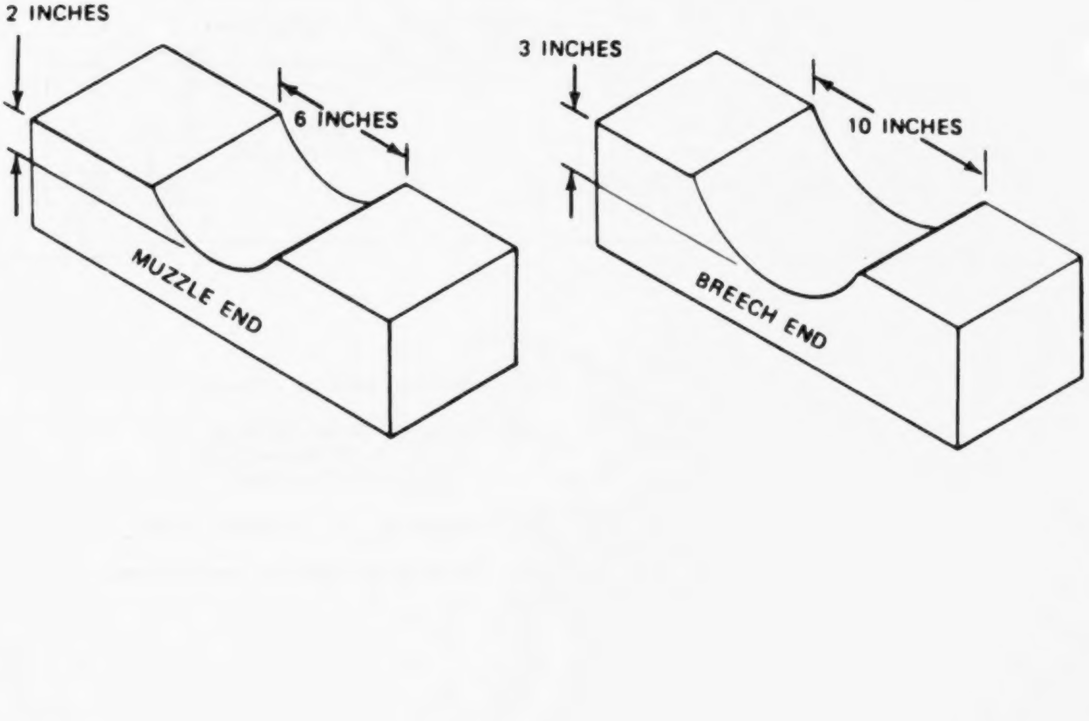
8. SHUTTLE VALVE TEST MANIFOLD


4
4
2
14
10
1
WELD
0.500 HOLE (3 PLACES)
WELD
2
6
1
0.500 HOLE
0.690 (2 PLACES)
0.500 DIA HOLE (2 PLACES)
0.500
12.09
0.500

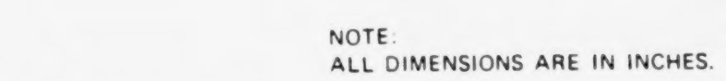
NOTES:

1. All dimensions are in inches.
2. Material: 1015/1025 Steel
    1 x 2 x 10 channel stock
    2 x 2 x 6 bar stock
3. Tolerance: 3 pl decimels ±0.006
4. Break sharp edges and remove burrs.

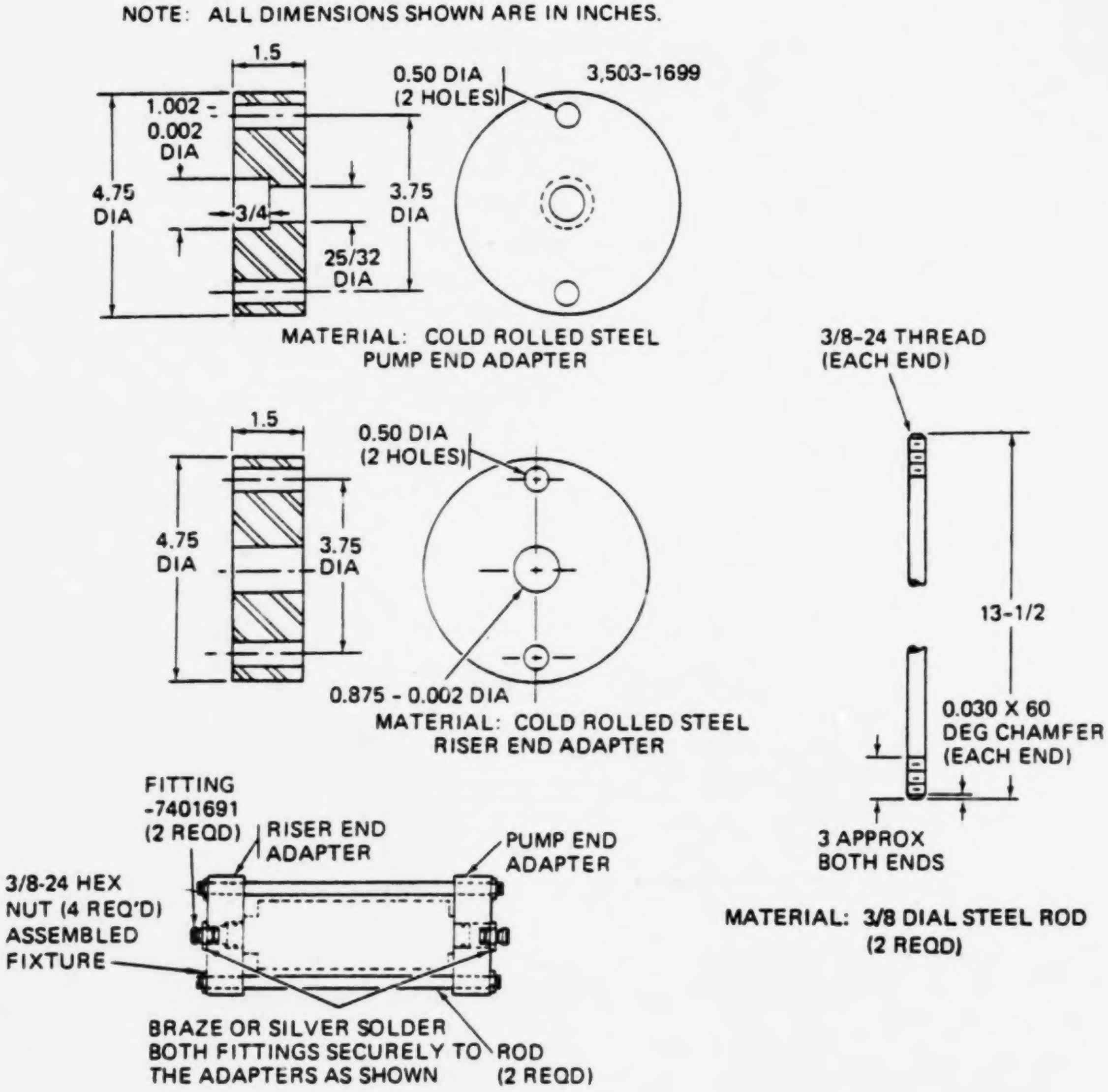
9. ELEVATING SCREW JACK ADJUSTMENT TOOL


2 INCHES
6 INCHES
MUZZLE END
3 INCHES
10 INCHES
BREECH END

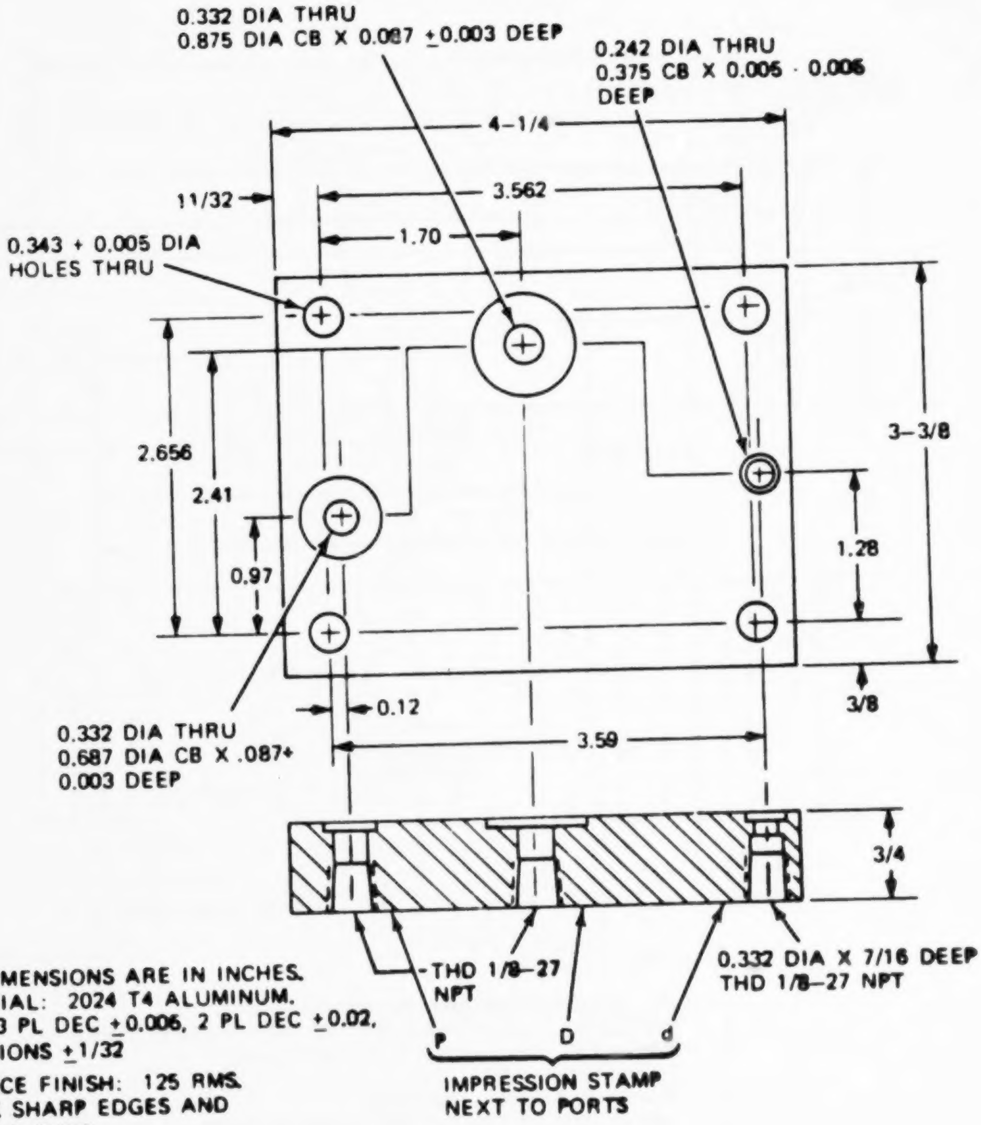
10. MUZZLE AND BREACH END WOOD BLOCKS


MATERIAL. DRILL ROD
WELD HERE
6
5/8
19
NOTE:
ALL DIMENSIONS ARE IN INCHES.

11. REPLENISHER PUSH ROD

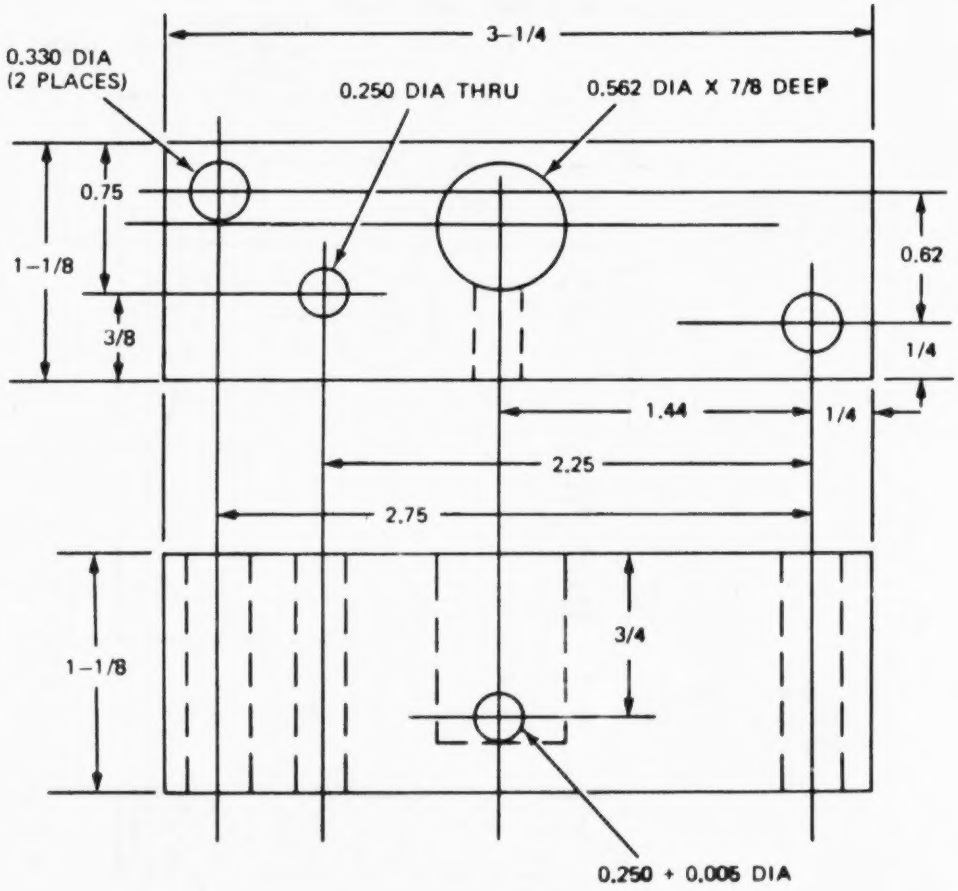

NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES.
1.5
1.002 -
0.002
DIA
4.75
DIA
3/4
3.75
DIA
25/32
DIA
0.50 DIA
(2 HOLES)
3,503-1699
MATERIAL: COLD ROLLED STEEL
PUMP END ADAPTER
1.5
0.50 DIA
(2 HOLES)
4.75
DIA
3.75
DIA
0.875 - 0.002 DIA
MATERIAL: COLD ROLLED STEEL
RISER END ADAPTER
3/8-24 THREAD
(EACH END)
13-1/2
0.030 X 60
DEG CHAMFER
(EACH END)
3 APPROX
BOTH ENDS
MATERIAL: 3/8 DIAL STEEL ROD
(2 REQD)
FITTING
-7401691
(2 REQD)
RISER END
ADAPTER
PUMP END
ADAPTER
3/8-24 HEX
NUT (4 REQ'D)
ASSEMBLED
FIXTURE
BRAZE OR SILVER SOLDER
BOTH FITTINGS SECURELY TO
THE ADAPTERS AS SHOWN
ROD
(2 REQD)

12. OIL FILTER TEST FIXTURE


0.332 DIA THRU
0.875 DIA CB X 0.087 ±0.003 DEEP
0.242 DIA THRU
0.375 CB X 0.005 · 0.006
DEEP
4-1/4
11/32
3.562
1.70
0.343 + 0.005 DIA
HOLES THRU
2.656
2.41
0.97
3-3/8
1.28
3/8
0.12
3.59
0.332 DIA THRU
0.687 DIA CB X .087+
0.003 DEEP
3/4
THD 1/8-27
NPT
0.332 DIA X 7/16 DEEP
THD 1/8-27 NPT
P
D
d
IMPRESSION STAMP
NEXT TO PORTS

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: 2024 T4 ALUMINUM.
3. TOL: 3 PL DEC ±0.006, 2 PL DEC ±0.02, FRACTIONS ±1/32
4. SURFACE FINISH: 125 RMS.
5. BREAK SHARP EDGES AND REMOVE BURS.

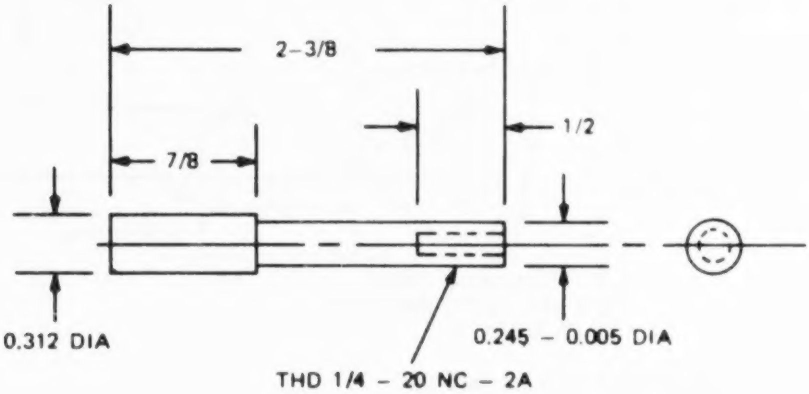
13. GUNNER'S CONTROL HYDRAULIC VALVE MANIFOLD


3–1/4
0.330 DIA
(2 PLACES)
0.250 DIA THRU
0.562 DIA X 7/8 DEEP
0.75
1–1/8
3/8
0.62
1/4
1.44
1/4
2.25
2.75
1–1/8
3/4
0.250 + 0.005 DIA

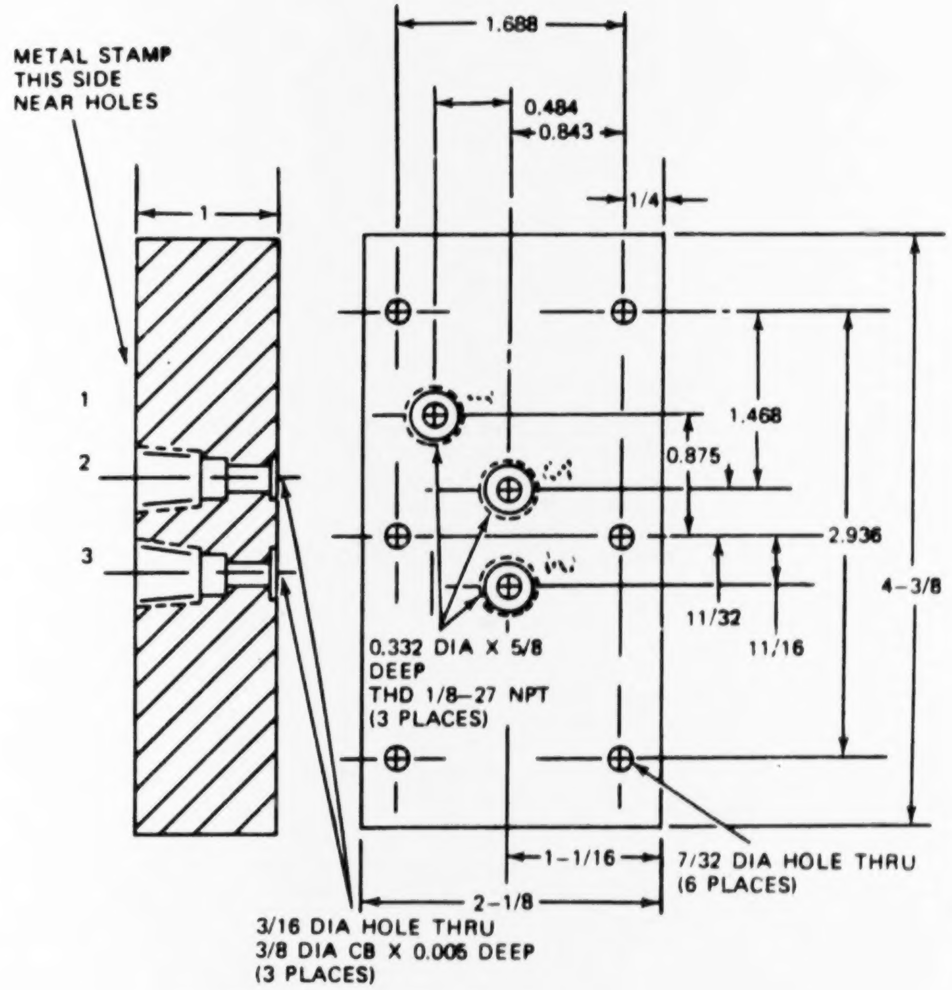
1. ALL DIMENSIONS ARE IN INCHES
2. MATERIAL: 2024 T4 ALUMINUM OR 1015/1030 STEEL
3. TOL: 3 PL DEC ±0.010, 2 PL DEC ±0.02, FRACTIONS ±1/32
4. SURFACE FINISH: 250 RMS
5. BREAK SHARP EDGES AND REMOVE BURS

14. GUNNER'S CONTROL HYDRAULIC VALVE FIXTURE

1. ALL DIMENSIONS ARE IN INCHES
2. MATERIAL: 1015/1030 STEEL
3. TOL: 3 PL DEC ±0.010, FRACTIONS ±1/32
UNLESS OTHERWISE INDICATED
4. SURFACE FINISH: 125 RMS
5. BREAK SHARP EDGES AND REMOVE BURS

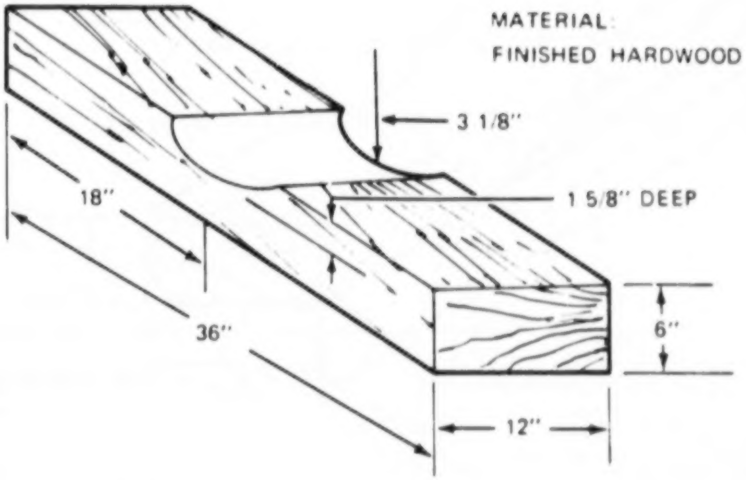

2-3/8
1/2
7/8
0.312 DIA
0.245 - 0.005 DIA
THD 1/4 - 20 NC - 2A

15. GUNNER'S CONTROL HYDRAULIC VALVE ADAPTER

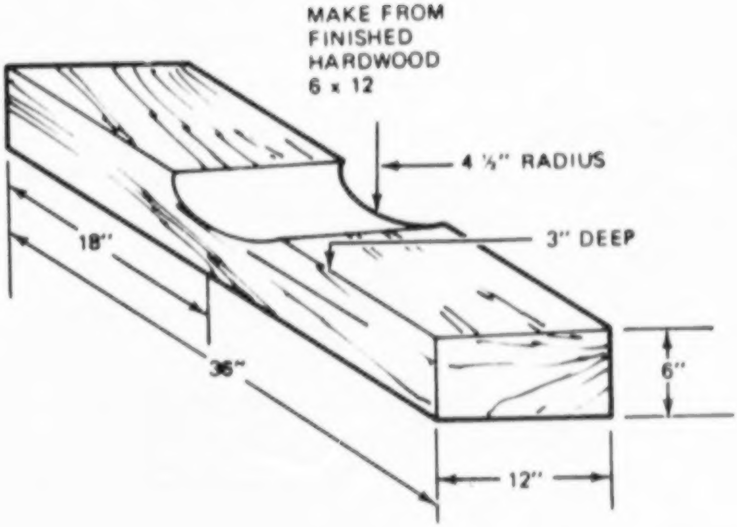

METAL STAMP THIS SIDE NEAR HOLES
1
1
2
3
1.688
0.484
0.843
1/4
1.468
0.875
2.936
4-3/8
11/32
11/16
0.332 DIA X 5/8 DEEP THD 1/8-27 NPT (3 PLACES)
1-1/16
7/32 DIA HOLE THRU (6 PLACES)
2-1/8
3/16 DIA HOLE THRU 3/8 DIA CB X 0.005 DEEP (3 PLACES)

1. ALL DIMENSIONS ARE IN INCHES.
2. MATERIAL: 1020/1030 STEEL.
3. TOL: 3 PL DEC ±0.005, 2 PL DEC ±0.02, FRACTIONS ±1/32.
4. SURFACE INSIDE: 125 RMS.
5. BREAK SHARP EDGES AND REMOVE BURRS.

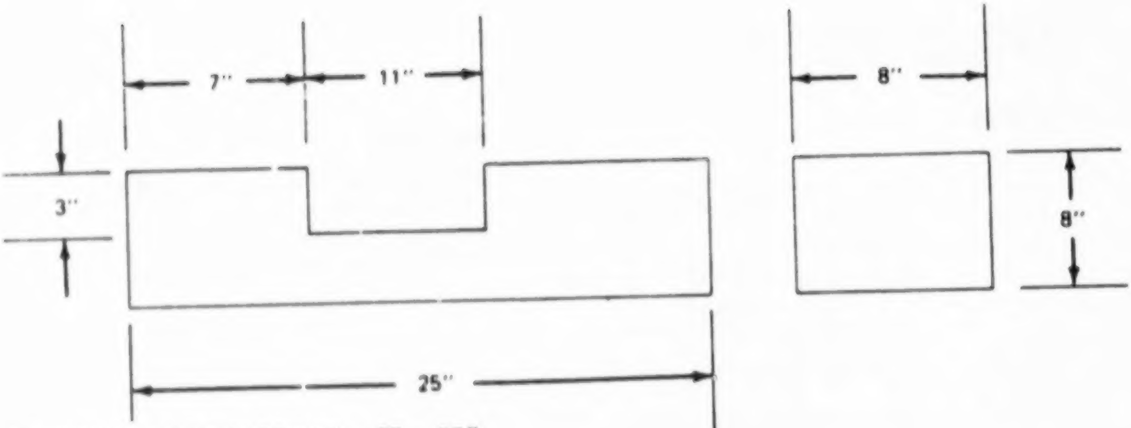
16. MANUAL ELEVATION PUMP TEST MANIFOLD


MATERIAL:
FINISHED HARDWOOD
3 1/8"
1 5/8" DEEP
18"
36"
6"
12"

17. GUN MOUNT WOOD BLOCK

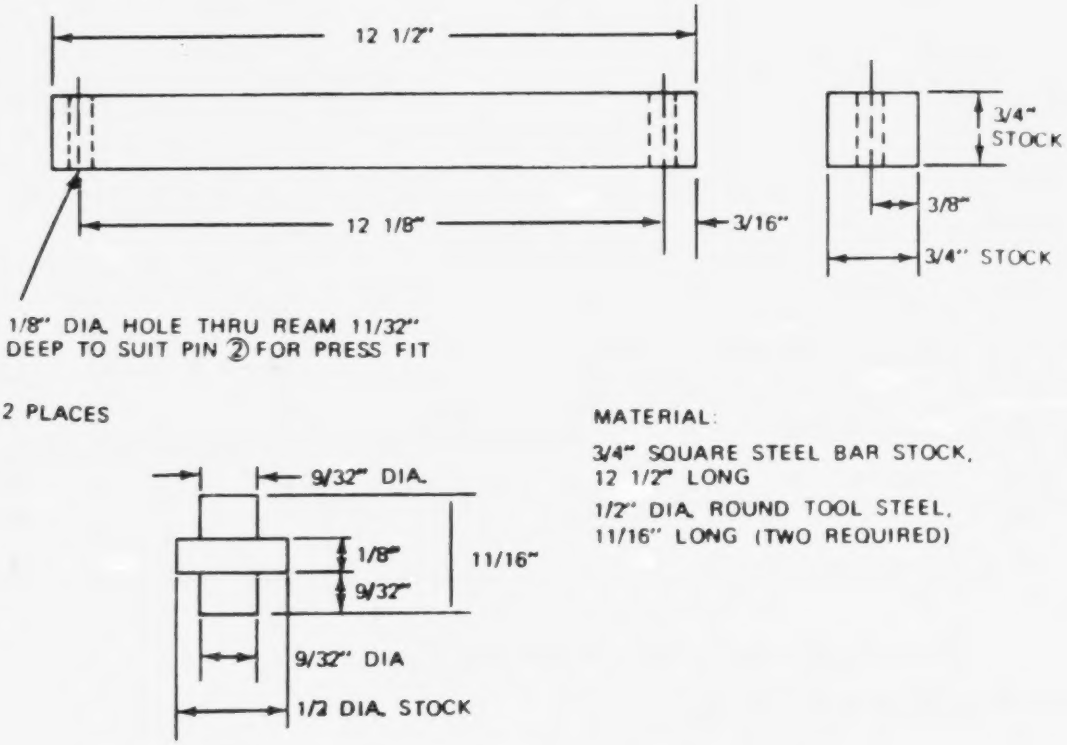

MAKE FROM
FINISHED
HARDWOOD
6 x 12
4 ½" RADIUS
3" DEEP
18"
36"
6"
12"

18. CANNON TUBE WOOD BLOCK



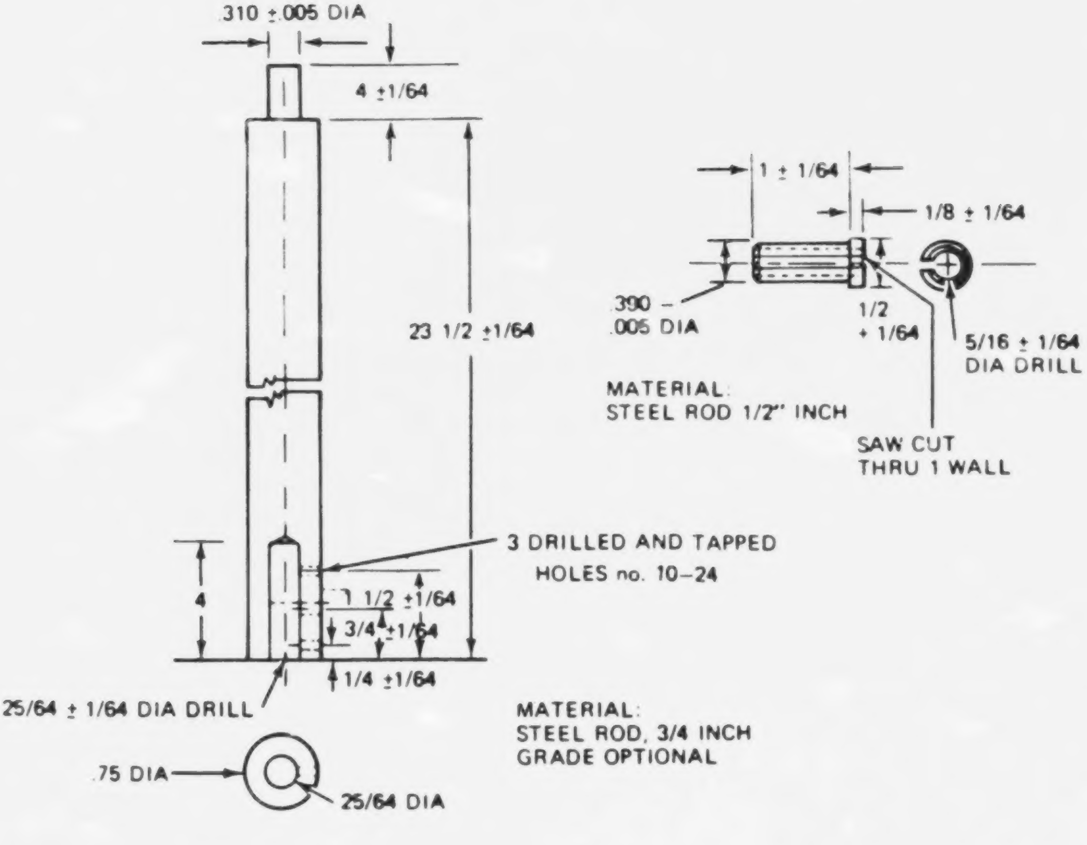
MATERIAL: WOOD BLOCK 8" x 8" x 25"

19. RECOIL MECHANISM WOOD BLOCK

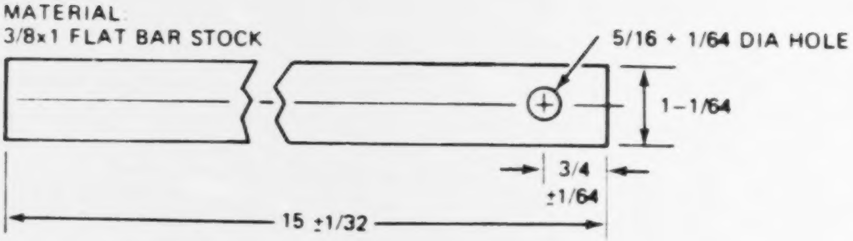

12 1/2"
12 1/8"
3/16"
3/4" STOCK
3/8"
3/4" STOCK
1/8" DIA. HOLE THRU REAM 11/32" DEEP TO SUIT PIN ② FOR PRESS FIT
2 PLACES
9/32" DIA.
1/8"
9/32"
11/16"
9/32" DIA
1/2 DIA. STOCK
MATERIAL:
3/4" SQUARE STEEL BAR STOCK, 12 1/2" LONG
1/2" DIA. ROUND TOOL STEEL, 11/16" LONG (TWO REQUIRED)

20. RECOIL PISTON ADAPTER SPANNER WRENCH

All data on page B-23, figure 21, deleted.

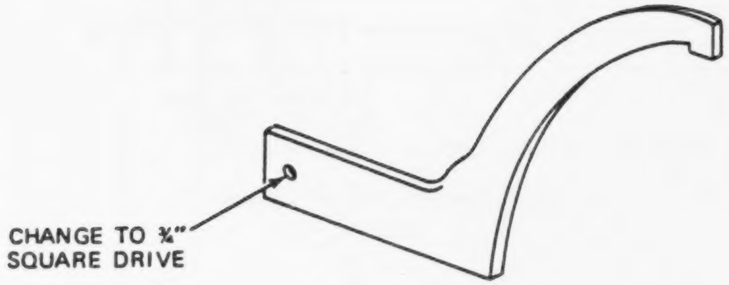

.310 ±.005 DIA
4 ±1/64
23 1/2 ±1/64
3 DRILLED AND TAPPED HOLES no. 10–24
4
1 1/2 ±1/64
3/4 ±1/64
1/4 ±1/64
25/64 ± 1/64 DIA DRILL
.75 DIA
25/64 DIA
MATERIAL:
STEEL ROD, 3/4 INCH
GRADE OPTIONAL
1 ± 1/64
1/8 ± 1/64
.390 – .005 DIA
1/2 + 1/64
5/16 ± 1/64 DIA DRILL
MATERIAL:
STEEL ROD 1/2" INCH
SAW CUT THRU 1 WALL

22. RECOIL MECHANISM DRILL EXTENSION AND SPLIT BUSHING


MATERIAL:
3/8x1 FLAT BAR STOCK
5/16 + 1/64 DIA HOLE
1-1/64
3/4
±1/64
15 ±1/32

NOTE: ALL MEASUREMENTS ARE IN INCHES

23. RECOIL MECHANISM UPPER GUIDE PLATE


CHANGE TO ¾"
SQUARE DRIVE

24. SPANNER WRENCH (12252792 MODIFIED)

INDEX	PART	PARA
ACCUMULATOR, MAIN	5	16-1
ACCUMULATOR, MANUAL ELEVATION	4	13-7
ACTUATOR, SUPERELEVATION	5	17-1
AZIMUTH GEAR BOX, CUPOLA	3	12-11
BLOWER, TURRET VENTILATING	2	7-1
BREECH RING	3	11-6
CAM, TURRET LOCK	5	Part of 19-9, 19-10
CANNON TUBE M68	3	11-2
CHECK VALVE	4	13-28
CLAMP, GUNNER'S CONTROL	4	Part of 13-98, 13-99
CLUTCH	6	20-23
COMBINATION GUN MOUNT, 105-MM	3	11-1
COMMANDER'S CONTROL HANDLE	5	14-1
CONTROL BOX, GUNNER'S	2	6-1
CONTROL HANDLE, COMMANDER'S	5	14-1
CONTROL SELECTOR, STABILIZATION	6	23-1
CONTROL, GUNNER'S	4	13-71
CRANK, CUPOLA AZIMUTH GEAR BOX	3	Part of 12-14, 12-15
CUPOLA	3	12-1
CUPOLA AZIMUTH GEAR BOX	3	12-11
CUPOLA BEARING COMPONENTS	3	12-5
CUPOLA ELECTRICAL SYSTEM	2	8-1
CUPOLA GUARDS	2	9-1
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VENTILATING BLOWER, TURRET	2	7-1
YOKE, HANDLE	4 Part of	13-61, 13-62

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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DATE Date you fill out this form.

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TM 9-XXXX-XXX-XX	Date of TM	Title of TM

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.
2-8			2-1	Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

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REVERSE OF DA FORM 2028-2 (TEST)

Charts Transposed to
End of Volume.

THE METRIC SYSTEM

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

APPROXIMATE CON

TO CHANGE	T
Inches	Ce
Feet	Me
Yards	Me
Miles	Ki
Square Inches	Sc
Square Feet	Sc
Square Yards	Sc
Square Miles	Sc
Acres	Sc
Cubic Feet	Cu
Cubic Yards	Cu
Fluid Ounces	Mi
Pints	Li
Quarts	Li
Gallons	Li
Ounces	Gr
Pounds	Ki
Short Tons	Me
Pound-Feet	Ne
Pounds per Square Inch	Ki
Miles per Gallon	Ki
Miles per Hour	Ki

TO CHANGE	TO
Centimeters	In
Meters	Fe
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Kilometers	Mi
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Square Meters	Sq
Square Meters	Sq
Square Kilometers	Sq
Square Hectometers	Ac
Cubic Meters	Cu
Cubic Meters	Cu
Milliliters	Fl
Liters	Pi
Liters	Qu
Liters	Ga
Grams	Ou
Kilograms	Po
Metric Tons	Sh
Newton-Meters	Po
Kilopascals	Po
Kilometers per Liter	**Mi**
Kilometers per Hour	**Mi**

AND EQUIVALENTS

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9\ (^0F - 32) = {}^0C$
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
$9/5\ C^0 + 32 = F^0$

VERSION FACTORS

D	MULTIPLY BY
entimeters	2.540
eters	0.305
eters	0.914
lometers	1.609
uare Centimeters	6.451
uare Meters	0.093
uare Meters	0.836
uare Kilometers	2.590
uare Hectometers	0.405
bic Meters	0.028
bic Meters	0.765
lliliters	29.573
ters	0.473
ters	0.946
ters	3.785
ams	28.349
lograms	0.454
tric Tons	0.907
wton-Meters	1.356
lopascals	6.895
lometers per Liter	0.425
lometers per Hour	1.609

D	MULTIPLY BY
ches	0.394
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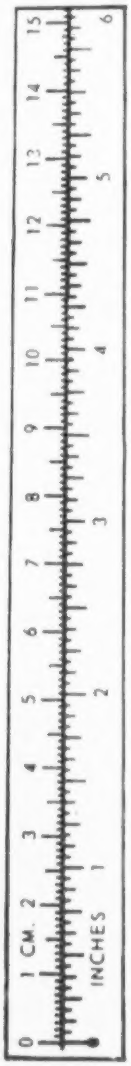
uare Inches	0.155
uare Feet	10.764
uare Yards	1.196
uare Miles	0.386
res	2.471
bic Feet	35.315
bic Yards	1.308
uid Ounces	0.034
nts	2.113
arts	1.057
llons	0.264
nces	0.035
unds	2.205
ort Tons	1.102
und-Feet	0.738
unds per Square Inch	0.145
les per Gallon	2.354
les per Hour	0.621



TA089991

TM 9-2350-257-34-2-6

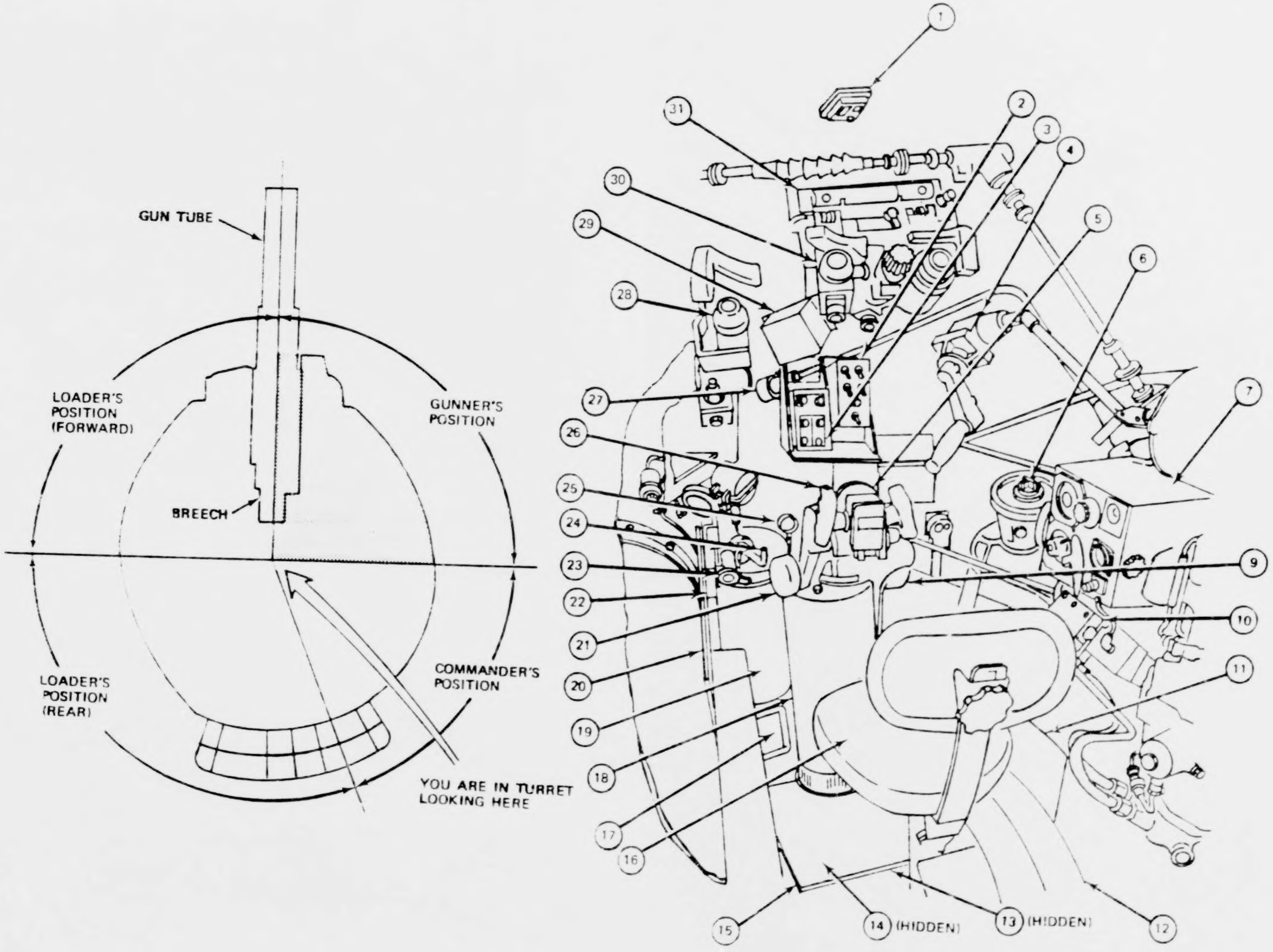
TURRET FOR TANK, COMBAT, FULL-TRACKED: 105-MM GUN, M60A1 (RISE) (2350-00-116-9765) AND M60A1 (RISE PASSIVE) (2350-01-059-1503), PART 6, MAINTENANCE

1980

PIN : 046356-000

LEGEND:

1. GUNNER'S DOMELIGHT
2. GUNNER'S CONTROL BOX
3. STABILIZATION CONTROL SELECTOR
4. HAND TRAVERSING DRIVE
5. GUNNER'S CONTROL
6. AZIMUTH INDICATOR
7. BALLISTIC COMPUTER
8. MANUAL TRAVERSING HANDLE
9. TURRET HYDRAULIC SYSTEM FILTER
10. TRAVERSE STABILIZER VALVE
11. GUNNER'S FOOTGUARD
12. 7.62 MM AMMUNITION BOX
13. POWER PACK BLOWER
14. TURRET POWER AND SEARCHLIGHT RELAY BOX
15. GUNNER'S FOOTREST PLATE
16. GUNNER'S SEAT
17. GUNNER'S KNEE GUARD
18. POWER PACK
19. MAIN ACCUMULATOR
20. GUNNER'S GUARD
21. MANUAL ELEVATING HANDLE
22. STABILIZATION RATE SENSOR
23. ELEVATION QUADRANT
24. BLASTING MACHINE
25. PRESSURE GAUGE
26. GUNNER'S CONTROL HANDLES
27. SUPERELEVATION ACTUATOR
28. ARTICULATED TELESCOPE M105D
29. TURRET GUN FIRING RELAY BOX
30. GUNNER'S PERISCOPE
31. GUNNER'S PERISCOPE MOUNT M118


GUN TUBE
LOADER'S POSITION (FORWARD)
GUNNER'S POSITION
BREECH
LOADER'S POSITION (REAR)
COMMANDER'S POSITION
YOU ARE IN TURRET LOOKING HERE
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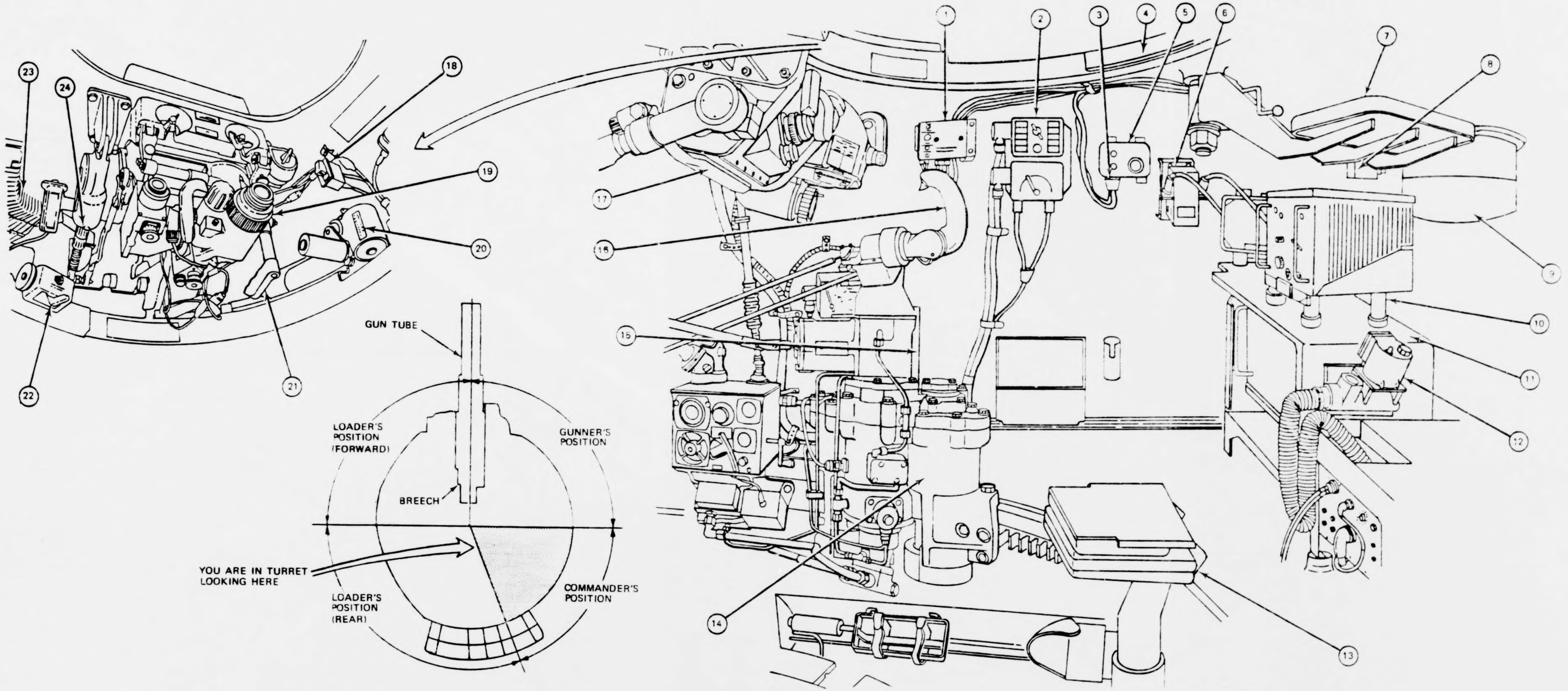
15
14 (HIDDEN)
13 (HIDDEN)
12

FO-1. EQUIPMENT LOCATION INFORMATION - GUNNER'S POSITION

best copy available

LEGEND:

1. CUPOLA ELECTRICAL POWER CONTROL PANEL
2. COMMANDER'S INTERPHONE CONTROL BOX
3. SEARCHLIGHT DUMMY PLUG
4. BACKREST PAD
5. SEARCHLIGHT CONTROL BOX
6. BATTLE OVERRIDE SWITCH (RADIO)
7. COMMANDER'S SWING SEAT
8. INTERCONNECTING BOX
9. TURRET VENTILATING BLOWER
10. TURRET RADIO SUPPORTS
11. RADIO RACK
12. COMMANDER'S ELECTRIC AIR FILTER HEATER
13. COMMANDER'S SEAT
14. TURRET TRAVERSING MECHANISM
15. ANTI-BACKLASH MECHANISM
16. COMMANDER'S CONTROL HANDLE
17. FIRE CONTROL RANGEFINDER
18. CUPOLA GUN SAFETY SWITCH AND GUARD
19. COMMANDER'S PERISCOPE
20. CUPOLA AZIMUTH GEAR BOX
21. SHIELD OPERATING HANDLE
22. CUPOLA AZIMUTH LOCK
23. FLEXIBLE CHUTE
24. ELEVATION SCREW JACK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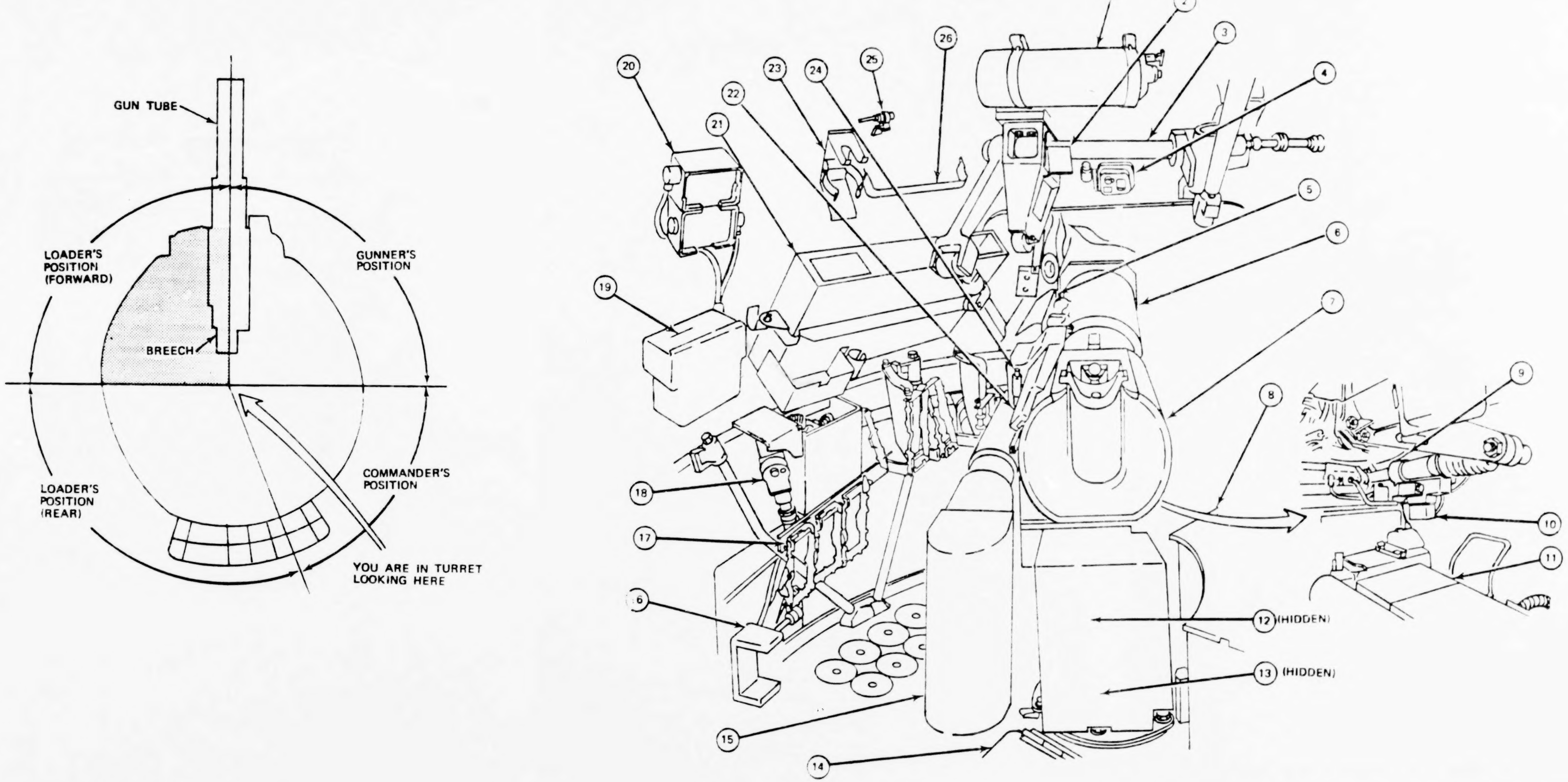
GUN TUBE
LOADER'S POSITION (FORWARD)
GUNNER'S POSITION
BREECH
YOU ARE IN TURRET LOOKING HERE
COMMANDER'S POSITION
LOADER'S POSITION (REAR)

FO-2. EQUIPMENT LOCATION INFORMATION - COMMANDER'S POSITION

LEGEND:

1. REPLENISHER
2. GUN ELEVATION INTERFERENCE SWITCH
3. BALLISTIC DRIVE
4. LOADER'S DOMELIGHT
5. MACHING GUN MOUNT
6 105—MM GUN
7. BREECH
8. CALIBER .50 AMMUNITION BOXES
9. ELEVATING MECHANISM
10. ELEVATION STABILIZER VALVE
11. PERISCOPE STOWAGE BOX
12. STABILIZATION CONTROLLER UNIT
13. TURRET ELECTRICAL SLIPRING
14. BATTERY ACCESS DOOR
15. 105—MM AMMUNITION THREE ROUND LEFT SIDE RACK
16. FIRE EXTINGUISHER MOUNTING BRACKET
17. 105—MM AMMUNITION RACK RETAINER
18. LOADER'S ELECTRIC AIR FILTER HEATER
19. LOADER'S PERISCOPE BOX
20. LOADER'S INTERPHONE CONTROL BOX
21. 7.62—MM READY ROUND AMMUNITION BOX AND COVER
22. LOADER'S GUARD
23. OILCAN MOUNTING BRACKET
24. LOADER'S SAFETY SWITCH
25. RADIATION DETECTOR
26. CANTEEN MOUNTING BRACKET


GUN TUBE
LOADER'S POSITION (FORWARD)
GUNNER'S POSITION
BREECH
LOADER'S POSITION (REAR)
COMMANDER'S POSITION
YOU ARE IN TURRET LOOKING HERE
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13 (HIDDEN)
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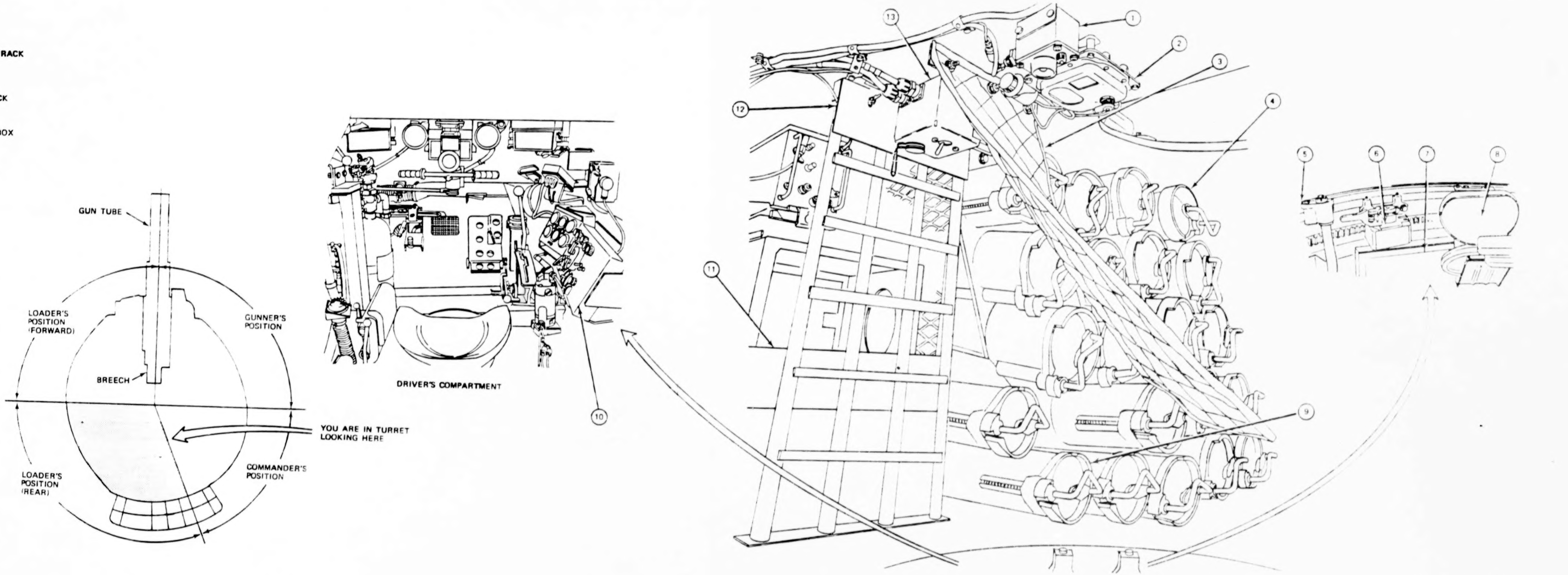
FO-3. EQUIPMENT LOCATION INFORMATION - LOADER'S POSITION (FORWARD)

LEGEND:

1. STABILIZATION SHUT-OFF BOX
2. COMMANDER'S DOMELIGHT
3. SHELL EJECTING SHIELD
4. EIGHTEEN ROUND AMMUNITION STOWAGE RACK
5. SHELL RETURN HANGER
6. TURRET TRAVERSE LOCK
7. TURRET PLATFORM GUARD
8. LOADER'S SEAT
9. THREE ROUND AMMUNITION STOWAGE RACK
10. DRIVER'S MASTER CONTROL PANEL
11. ODDMENT TRAY
12. RADIO GUARD
13. TURRET VENTILATING BLOWER CONTROL BOX


GUN TUBE
LOADER'S POSITION (FORWARD)
GUNNER'S POSITION
BREECH
YOU ARE IN TURRET LOOKING HERE
LOADER'S POSITION (REAR)
COMMANDER'S POSITION
DRIVER'S COMPARTMENT
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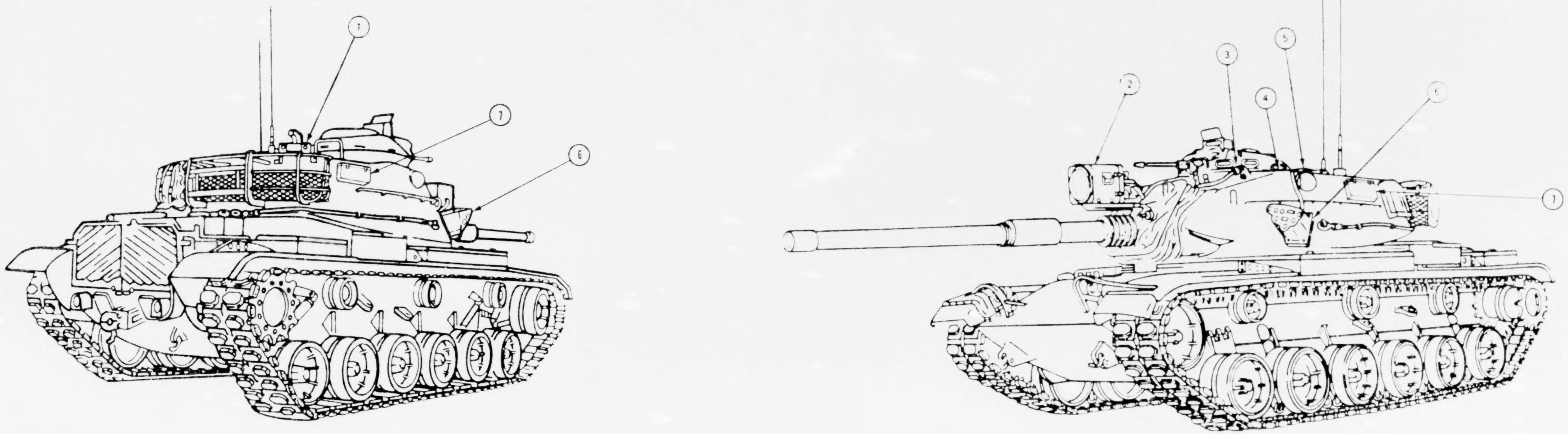
FO-4. EQUIPMENT LOCATION INFORMATION - LOADER'S POSITION (REAR)

LEGEND

1. SEARCHLIGHT STOWAGE BOX
2. SEARCHLIGHT
3. SEARCHLIGHT CONNECTOR
4. LOADER'S ESCAPE HATCH
5. HOUSING
6. SMOKE GRENADE DISCHARGER
7. STOWAGE BOX



FO-5. EQUIPMENT LOCATION INFORMATION - OUTSIDE TANK